Red List of the endemic and range-restricted vascular plants of Burundi

Salvator Ntore • Eberhard Fischer • Marc S.M. Sosef

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Salvator Ntore
Eberhard Fischer
Marc S.M. Sosef

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Address of the authors

Dr. Salvator Ntore & Dr. Marc S.M. Sosef
Meise Botanic Garden, Nieuwelaan 38, B-1860 Meise, Belgium

Prof. Dr. Eberhard Fischer
Universität Koblenz-Landau, Institut für Integrierte Naturwissenschaften, Abteilung Biologie, Universitätsstraße 1, 56070 Koblenz, Deutschland

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Abstract

A rigorous and detailed IUCN Red List evaluation of the threat status of the endemic and range-restricted vascular plant species found in Burundi is presented. The assessments are based on herbarium collection data supplemented with field observations and information obtained from literature. They follow the guidelines and criteria developped by the International Union for Conservation of Nature (IUCN). The results show that out of the 135 taxa examined 21 (15%) are of Least Concern (LC) while 110 (82%) are threatened, 2 (1.5%) are Near Threatened (NT) and 2 (1.5%) are Data Deficient (DD). Amongst the threatened, 24 (18%) are Critically Endangered (CR), of which 18 (13%) have received the addition Possibly Extinct (PE), 61 (45%) are Endangered (EN), 25 (18%) are considered as Vulnerable (VU). In addition to the Red List assessments, each species comes with its correct scientific name, its vernacular name (when available), a brief morphological description, an illustration (photo or drawing), data on habitat and seed or spore dispersal as well as a map showing its distribution.

Key words – Area of occupancy, assessment criteria, Burundi, conservation, continuing decline, Critically Endangered, Endangered, endemic, Extent of occurrence, Extinct, IUCN, IUCN Red List category, Least Concern, location, protected area, threat, Vulnerable.

Résumé

Une évaluation UICN Liste Rouge rigoureuse et détaillée de l'état des menaces des espèces de la flore vasculaire à distribution restreinte du Burundi et ses environs est présentée. Les évaluations sont basées sur des données des collections d'herbier, complétées par des observations de terrain et des sources provenant de la littérature. Elles suivent les catégories et les critères de l'Union Mondiale de Conservation de la Nature (UICN). Les résultats montrent que sur 135 taxons évalués 21 (15%) constituent une préoccupation mineure (LC) tandis que 110 (82%) sont menacées, 2 (1,5%) quasi menacées (NT) et 2 (1,5%) ont des données insuffisantes (DD). Parmi les menacées 24 (18%) sont au bord de l'extinction (CR), dont 18 (13%) sont probablement déjà disparues (PE), 61 (45%) sont en danger (EN), 25 (18%) sont considérées comme vulnérables (VU). En plus de l'évaluation Liste Rouge, chaque espèce vient avec son nom scientifique accepté, son nom vernaculaire (si disponible), une brève description morphologique, une illustration (photo ou dessin), des données sur l'habitat et la dispersion des graines ou spores, ainsi qu'une carte de sa distribution.

Acknowledgements

The authors wish to thank all those who contributed in all phases of the preparation of this work, from conceptualization to its realization. They express their specific thanks to Tariq Stevart, Piet Stoffelen, Olivier Lachenaud, Steven Dessein and Frederik Leliaert for many constructive discussions and suggestions to improve a first draft. They gratefully acknowledge the Eastern African Plant Red List Authority (EAPRLA) team members for their highly appreciated contributions to the plant assessments during several workshops, namely Henk Beentje, Roy Gereau, Christine Kabuye, James Kalema, Canisius Kayombo, Mbaluka Kimeu, Quentin Luke, Mike Maunder, Moses Mwangoka and Samuel Nshutiyayesu. They are also indebted to all those who made available photographs and/or drawings to be re-used in this publication, and all others providing relevant information. Here, they especially thank Chistine Cocquyt for having provided several images taken by her beloved late husband, A.G. Caljon, a former professor at University of Burundi.

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Introduction

Despite its modest size (27,834 km^2), Burundi is home to a rich biodiversity (Anonymous, 2000; Hobbs & Knausenberger, 2003; Verschuren, 1977). This richness results from a complex interplay of influences (factors), notably its phytogeographical position, its topography, and its related soil and climate conditions. The number of known vascular plants species present in Burundi is around 3,800 (Ntore & Sosef, work in progress; Sosef & *al.*, 2017), but, despite of the important past collecting efforts of many, notably those of M. Reekmans and J. Lewalle, the botanical exploration of the country is far from complete.

Phytogeographic position

Burundi is located at the intersection of three major phytogeographical regions, namely the Guineo-Congolian Region, the Sudano-Zambezian Region and the Afromontane Region (White, 1983) (Fig. 1). Furthermore, two well-defined subregions of the Sudano-Zambezian Region, i.e. the Zambesian Domain and the Afro-Oriental Domain, reach their limit in Burundi (Lambinon & Reekmans, 1980). This partly explains the high level of botanical diversity present in the country. More recently, Linder & *al.* (2012) found that the Burundi region shows high heterogeneity in most plant as well as animal groups, while Sosef & *al.* (2017) could confirm high plant species turnover figures for Burundi, which corroborates its position at the borders of different biogeographical zones.

Topography

The country is subjected to a varied relief and wide altitudinal range (Lambinon & Reekmans, 1980; Reekmans, 1981). Its elevation spans from around 780 m (level of Lake Tanganyika) to 2670 m above sea level at the summit of Mount Teza, across a distance of less than 20 km as the crow flies (Maldague, 1980). As a result, this topography induces a strong variation of climate within a small area, which confers an important geo-climatic diversity on the wildlife habitat. These special conditions have resulted in a strong layering of the vegetation and the occurrence of numerous endemic species of high scientific and conservation interest (Maldangue, 1980).

In Burundi, four major natural topographies can be distinguished (Fig. 1):

• At the westernmost edge of the country lies a narrow north-south oriented plain, the Imbo plain, which belongs to the western branch of the Great Rift Valley, and is situated along the Rusizi River and the eastern shore of Lake Tanganyika. The plain is located between 780 and 1000 m altitude, has an average annual temperature above 23°C, and receives an average annual precipitation of 800–1100 mm.

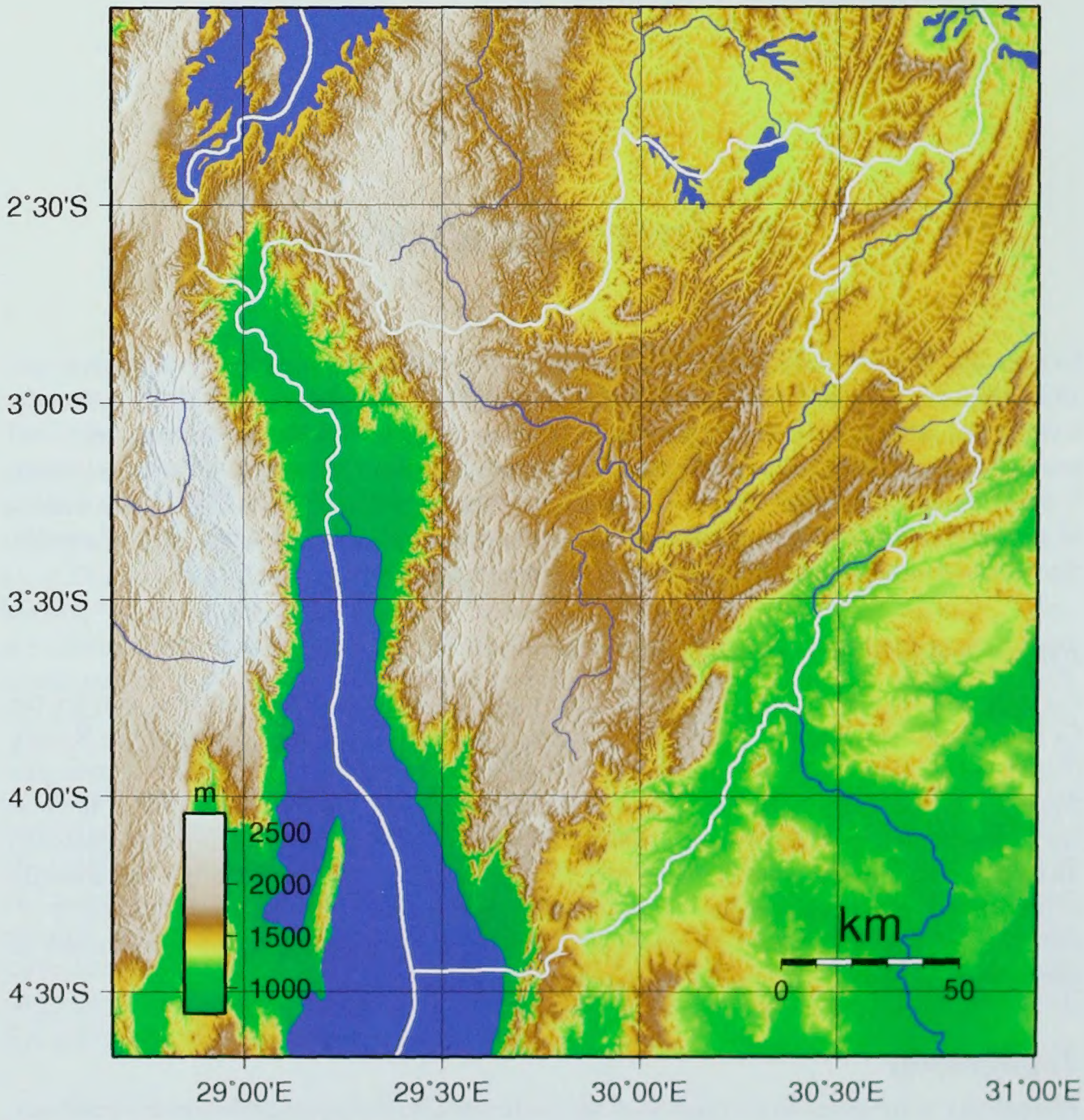


Figure 1 – Topographic map of Burundi.

• East of the Imbo plain, a narrow and steep north-south oriented mountain chain, generally less than 16 km wide, rises up that forms part of the divide between the Nile and Congo River basins. This Congo-Nile watershed extends across the entire length of the country, with an elevation oscillating between 1700 and 2600 m. It has an average annual temperature of 14–15°C and receives approximately 1300–2000 mm of annual precipitation.

• To the east of the rugged Congo-Nile Divide lies the Central Plateau. This plateau covers the whole middle part of the country and, generally, slopes down from west to east and from south to north. The south-eastern edge of the Central Plateau is marked by another area of higher ground. This chain of hills, which joins the mountains of the Congo-Nile divide in the extreme south-west of the country, falls away steeply south-eastwards to the Kumoso depression. The Central Plateau is located between 1400 and 2000 m altitude, has

Figure 2 – Kibira montane rainforest seen from Rugazi. Photo by A.G. Caljon (†), provided by Christine Cocquyt (©), taken at Rugazi, western Burundi.

Figure 3 – Open forest. Photo by A.G. Caljon (†), provided by Christine Cocquyt (©), taken at Rumonge, western Burundi.

an average annual temperature of 18–20°C and receives approximately 1200–1500 mm of annual precipitation.

• Finally, in the south-east, near the country's eastern and south-eastern borders with Tanzania, lies the Kumoso depression, while in the extreme north of the country we find the Bugesera depression. These depressions have an average elevation of 1100–1400 m, experience an average annual temperature of 20–23°C, and receive an average annual precipitations of less than 1200 mm.

Vegetation

The considerable variations in topography, soil and climate are responsible for the large number of vegetation types being present in Burundi (Kanyamibwa & Vande weghe, 2001; Stuart & Adams, 1990). Each of the orographic regions mentioned in the paragraph on topography corresponds to one or more natural vegetation types. Burundi's natural vegetation is broadly categorized into six main types: montane rain forest, open forest, mesophilic forest, savannah, swamp and the Ericaceous belt. These are discussed below.

• **Montane rain forest** – Essentially, this forest occupies the northern Congo-Nile Divide where it is called the Kibira Rainforest (Fig. 2). It is the biggest last vestige of the natural forest in the country, contains several vegetation strata and is a zone rich in both animal and plant diversity. It is contiguous to the Nyungwe forest in neighbouring Rwanda, both belonging to the Albertine Rift montane rain forest (which covers the western parts of Rwanda and Burundi, the eastern edge of the Democratic Republic of the Congo, and parts of western Uganda and Tanzania). Located at an altitude varying between 1600 and 2670 m, the Kibira Rainforest is part of the Afromontane region (White, 1983). Another small patch of rain forest called the Bururi Forest is situated on the extreme southern edge of the Congo-Nile Divide.

• **Open forests** – This vegetation englobes the dry forests and Miombo woodlands with their emblematic legume tree species. The Miombo woodlands occupy the coastal escarpments of the south-west, along Lake Tanganyika, from Minago until Nyanza-Lac, where they survive in isolated fragments (Fig. 3). But it is known that formerly they occurred further north, reaching the lower Rusibazi river at 3°45'S (Reekmans, 1981). They extend to the extreme north of the Kumoso-Buyogoma depression against the Tanzanian border, where

Figure 4 – Remnant savannah woodland with *Hyphaene* palm-grove. Photo by A.G. Caljon (†), provided by Christine Cocquyt (©), taken on the Rusizi Plain, Burundi.

Figure 5 Savannah grassland. Photo by A.G. Caljon (†), provided by Christine Cocquyt (©), taken in the Ruvubu Park, Burundi.

their northern limit is around 3°10'S, north of the Gitwenge mission (Reekmans, 1981), and dominate the Bugesera depression in the North of the country. They are located at an altitude of 1000–1700 m, and belong to the Soudano-Zambezian phytogeographical region. In north-western Burundi (on the Rusizi plain) and in the Bugesera depression in the North-East, these forests show an obvious afro-oriental Sudano-Zambezian influence (Reekmans, 1981) while in the South and the East they show a more exclusive Zambezian influence (Lewalle, 1972).

A sclerophyllous forest, made up essentially of palm grove, found in the floodplain of the lower Rusizi can be accommodated in this category (Fig. 4).

• **Mesophilic forest** This forest is an easternmost tiny remnant of the dense closed Guineo-Congolean rain forest. In Burundi, it survives along the banks of Lake Tanganyika, where it is encountered in Kigwena at an altitude of 770–800 m (Anonymous, 2007).

• **Savannah** In Burundi, savannahs are often wooded (Fig. 5) and occur commonly mixed with xerophilous thickets. They are encountered in the Kumoso depression in south-eastern Burundi (Fig. 6), in the Bugesera depression, in the North in part of the Buyogoma area, and in the West on the Rusizi floodplain. They are part of the Sudano-Zambezian phytogeographical region and belong to the Oriental domain (White, 1993) in the Rusizi plain and the north-eastern part of Burundi.

Figure 6 – Wooded savannah. Photo by A.G. Caljon (†), provided by Christine Cocquyt (©), taken at Muzye (Mosso), Burundi.

The grass-covered landscape found in parts of the Congo-Nile Divide and on the hills of the high Central Plateau has emerged after removal of the forest by the human population (Fig. 7). This tussock grassland is derived from fire caused by man, followed by continuous and deep grazing.

• **Swamp vegetation** – The major swamp and bog associations are found essentially in the northern river valleys which are dominated by papyrus. At higher altitudes (around 2000 m), one may encounter

Figure 7 – Upland grassland dominated by *Eragrostis olivacea* due to high grazing pressures, in western Burundi. Photo by Salvator Ntore (©), taken at Murambi hill (Rusaka), western Burundi.

a montane bog vegetation containing mosses, sedges, grasses and evergreen shrubs. It is present on the western-central part of the Plateau and on the southern Congo-Nile Divide.

• **Ericaceous belt** – The Ericaceous belt vegetation was described by Hedberg (1951) as a characteristic feature of all east African mountains. It still occurs on the top of the Congo-Nile Divide where it consists of dwarf shrubby species dominated by *Erica* mixed with perennial tussock-grasslands (Fig. 8).

Threats

Unfortunately, this small country faces a situation of having a population density of more than 400 persons per km^2 (information for 2017 provided by The World Bank Group; in Europe, only The Netherlands have a higher population density) and as a consequence

Figure 8 – Upland grassland with ericaceous shrubs. Photo by Jean Lejoly (©), taken on Mount Teza, Burundi.

the human factor carries a very heavy impact on the environment. Especially since about 90% of the population is employed in the agricultural sector (Hobbs & Knausenbergher, 2003), this demographic weight inevitably creates increasing needs and pressures, such as an exponentially growing need for agricultural land (for crops and cattle) and a rapidly increasing exploitation of natural resources (food, medicine, construction and firewood).

The extensive livestock farming causes considerable damage to the vegetation, giving rise to devastating erosion in many habitats. This leads to large scale destruction and degradation of habitats and to a dramatic reduction in the extent of natural environment. In Burundi, outside of protected areas, any remaining small patch of natural vegetation is doomed to the machete or to the hoe, or even to the fury of intentional fires. In many areas, the loss is so severe that there is almost no native vegetation left (Dennison & *al.*, 1989; Hobbs & Knausenberger, 2003; Kinyua, 2003; Lewalle, 1972; Stuart & Adams, 1990).

This severe reduction and or degradation of the extent or the quality of natural habitats inevitably puts many of Burundi's endemic and rare species in danger of extinction (IUCN, 2017). Indeed, their fate is intimately linked to that of the specific habitats that host them and they are usually the most likely to be at severe risk (Callmander & *al.*, 2005; Vamosi & Vamosi, 2005).

Faced with this alarming situation, there clearly is an urgent need for an accurate and objective assessment of the extinction risk level for Burundi's rich biodiversity. Here, we present such assessments for all endemic or range-restricted vascular plant species found in Burundi, following the internationally adopted IUCN Red List criteria and guidelines. The IUCN Red List is a widely recognized and accepted source of information that is essential to guide conservation efforts focused on species. The Red List provides an estimation of the

Figure 9 - Participants of the Eastern African Plant Red List Authority (EAPRLA) workshop, Lake Victoria Catchment Threatened Plant Project, Kampala, Uganda, April 18th-25th 2016. Photo by Quentin Luke (©)

extinction risk of individual species, which is one of the key components of any conservation plan at species level (Arroyo & *al.*, 2009). All assessments presented in this publication have been evaluated by the IUCN Eastern African Plant Red List Authority (EARPLA). Members of this authority form a panel of scientific plant experts with great knowledge of the specific region (see Fig. 9).

Methodology of IUCN Red List assessments

To assess the extinction risk of species, the IUCN (International Union for Conservation of Nature) has developed formal and widely accepted Red List Risk Categories as well as a transparent set of Criteria. This objective framework allows for the assignment of a given species to one of eight categories on a scale of rising extinction risk (Fig. 10). The system uses five different criteria: significant decline in population size (criterion A), restricted distribution and fragmented population, small and declining population size, very small population size (criteria B, C, D), and the results of a quantitative analysis (criterion E) (IUCN Standards and Petitions Subcommittee, 2014).

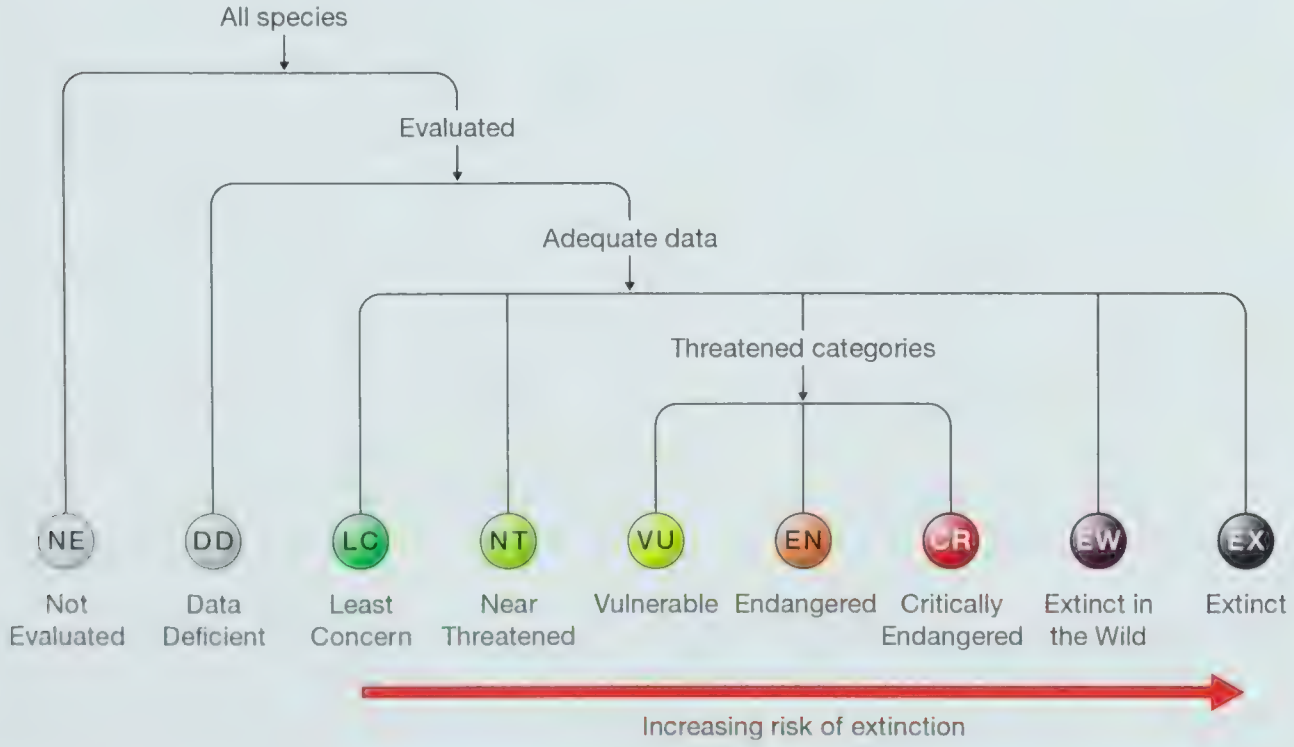


Figure 10 – Diagram of the IUCN categories (IUCN 2001); reproduced from IUCN (2012).

In most tropical regions, application of the criteria A, C, D and E (see above) to plant species is often difficult or impossible, because of a lack of the type of data that they require, especially observations on population size changes through time. In our case, with generally only presence/absence occurrence data available, the criterion B « Restricted Distribution » is best suitable for assigning a taxon (species, subspecies, variety) to its appropriate threat category (IUCN 2001 Categories & Criteria version 3.1; Hodgetts, 2015; Gaston & Fuller, 2008). For vascular plants, the process of an IUCN Red List assessment applying criterion B consists of the following steps:

1. Selecting or identifying target taxa (potentially threatened) on the basis of their rarity, restricted geographical range, occurrence in stressed habitats, etc. This first step uses

available literature as well as distributional data from verified herbarium collections and other reliable sources.

2. – Compilation of all available distributional data using various sources such as herbarium specimen labels, floristic literature, specimen databases, etc., and assessing their reliability in terms of correct species/taxon identification.

3. – Assigning geographic coordinates to each distributional data item and recording them on a spreadsheet. Recent observations and herbarium collections are usually recorded with a global positioning system; for older specimens these are assigned *post facto* using detailed maps or a gazetteer of botanical collecting localities. For Burundi, the latter is provided by Bamps (1982).

4. – Mapping of the obtained distributional data for each taxon using GIS software (we used *GeoCAT – Geospatial Conservation Assessment Tool*; http://geocat.kew.org/, which is specifically designed for this purpose).

5. – Calculating, using the GIS software, the two area parameters required for categorization of taxa under the geographic range criterion (B): the extent of occurrence (EOO) = the surface area of the minimum convex polygon comprising all occurrence points, and the area of occupancy (AOO) = area actually occupied by a taxon within its extent of occurrence. AOO is estimated by superimposing a grid onto the occurrence points and calculating the cumulative area of cells occupied by a taxon. While the IUCN Guidelines state that a grid cell size of 2 × 2 km^2 is appropriate in many cases, Callmander & *al.* (2007) have shown that for tropical plants a 3 × 3 km^2 grid cell size better reflects their overall poor level of geographic sampling. Hence, that recommendation has been adopted in the EAPRLA workflow.

6. – Recording the occurrences of each taxon within and outside of protected areas (using GIS software and the World Database of Protected Areas layer at http://www.protectedplanet.net).

7. – Evaluating the effectiveness of individual protected areas in protecting the specific taxon (or its habitat) as well as evaluating the threats to occurrence localities outside protected areas.

8. – Estimating the number of locations (subcriterion a) on the basis of known, inferred or suspected threats. A location is a geographically or ecologically distinct area in which a single threat event can rapidly affect all individuals of a taxon.

9. – Estimating continuing decline (subcriterion b) in one or more of five conditions (see below) affecting a taxon's global population. The decline is estimated, inferred or projected.

10. – Estimating extreme fluctuation (subcriterion c) in EOO, AOO, number of locations or subpopulations or the number of mature individuals, on the basis of available information of collection data, observations, etc (see below).

11. – Assessing the most suitable IUCN Red List category using the thresholds and subcriteria provided by IUCN. In order to be listed as 'threatened' (either as Vulnerable, Endangered or Critically Endangered), a taxon must have an extent of occurrence (B1) or an area of occupancy (B2) below the threshold value for one of the three threat categories (Table 1) and comply to at least 2 of the following 3 subcriteria:

- Distribution severely fragmented, OR number of locations = 1 (CR), ≤ 5 (EN), ≤ 10 (VU);

Table 1 – Threshold values for extent of occurrence (EOO) and area of occupancy (AOO) within criterion B.

Category	Critically Endangered	Endangered	Vulnerable
EOO (B1)	< 100 km^2	< 5000 km^2	< 20000 km^2
AOO (B2)	< 10 km^2	< 500 km^2	< 2000 km^2

- Continuing decline in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals;
- Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals.

12. Submission of the assessment of a taxon by the IUCN Authority to the IUCN Species Information Service (SIS). This report will be thoroughly checked before its formal approval and publication on the IUCN Red List website (www.iucnredlist.org). Even after publication, the species taxon will likely need re-assessment in the future, motivated either by a change in status due to a change in threats or habitat conditions, or by new data about its distribution or population conditions.

Species treatments

All vascular plant taxa are first divided in two groups, the ferns or Pteridophyta, followed by the seed plants or Spermatophyta. Then, the latter one further subdivided into the Dicotyledonae and Monocotyledonae. Within each group, the taxa are treated in alphabetical order by family and species. The elements used in the evaluation of each taxon, such as the distribution map, the supporting documentation to categories and criteria, as well as the final conservation status with appropriate categories and assessment criteria are provided. In addition, for each taxon relevant information on its correct scientific name, its vernacular names (when available), its diagnostic morphological characters, its habitat and seed (or spore) dispersal is provided. Finally, an illustration (photo or botanical drawing) is added to each taxon to support future recognition and hence the accumulation of more data.

PTERIDOPHYTA

Aspleniaceae

Asplenium burundense Pic.Serm.

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(iii)+2ab(iii).

Description – An epiphytic, or less frequently terrestrial, fern; rhizome erect, with triangular flexuose scales; fronds tufted; lamina up to 50 cm long; pinnae 12- to 16-jugate, attenuate towards the apex; sori elliptic.

Habitat – It occurs in the upper zone of montane moist forest, sometimes secondarized, at 2100–2600 m altitude.

Dispersal – Effective, with spores distributed by wind (anemochory).

Distribution – Only known from the Albertine Rift, occurring in western Burundi and eastern Democratic Republic of the Congo.

► ***Asplenium burundense*** – Habit (A), pinna (B). Drawing by L. De Floriani, Instituto Botanico dell'Università, Perugia (©), reproduced with permission from Pichi Sermolli (1977).

Red List parameters – EOO: 2,009 km^2; AOO: 54 km^2; Number of locations: 3.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) both comply with the criteria for the Endangered category under sub-criteria B1 and B2. This species is represented in herbaria by 10 specimens collected from 6 different sites between 1966 and 1977, and may thus be considered as rare. Three collecting sites fall within protected areas (the Kibira National Park in Burundi and the Kahuzi-Biega National Park in the Democratic Republic of the Congo). Three other populations occur on private land and are at risk of being negatively affected by human activities such as clearing, agricultural extension, livestock farming and firewood harvesting. These threats lead us to estimate the number of locations at 3 and to infer a continuing decline in habitat quality. Based on the above information, the species has been listed as Endangered (EN).

Bibliography – Ntore & *al.* (2017a1), Pichi Sermolli (1985), Roux (2009).

Asplenium centrafricanum Pic.Serm.

Red List category – **Vulnerable (VU)**.

IUCN criteria – B1ab(iii)+2ab(iii).

Description – An epiphytic, or less frequently terrestrial, fern; rhizome erect, fleshy; stipe glabrous or with few scales in the middle and upper part; lamina parchmentaceous, abruptly constricted into a caudate apex; pinnae oblong-lanceolate with segments only slightly diminishing in length upwards, lowermost pinnae with very unequal sides; sori oblong.

Habitat – It occurs in montane moist forest, sometimes degraded and secondarized, and in mixed montane moist and bamboo forest, occasionally in *Faurea-Rapanea* montane evergreen thicket and on scattered trees or thickets in swamps, at an elevation of 1650–2820 m.

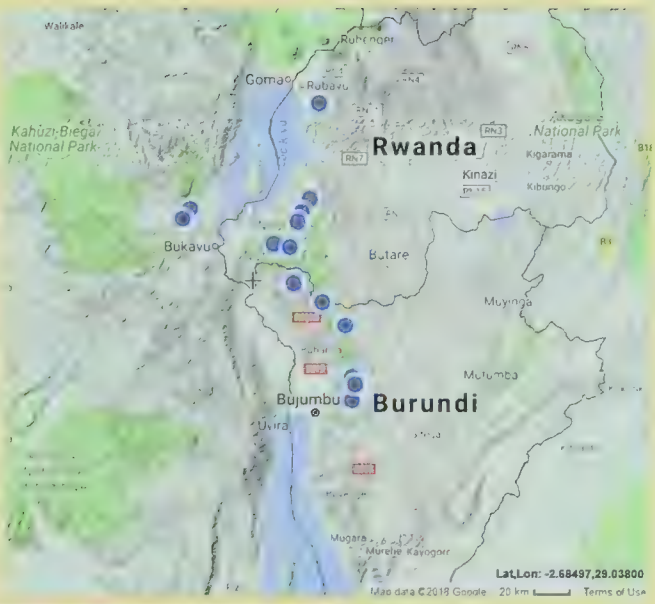
Dispersal – Effective, with spores distributed by wind (anemochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, western Rwanda, and eastern Democratic Republic of the Congo.

Red List parameters – EOO: 7,692 km^2; AOO: 144 km^2; Number of locations: 7.

Justification – The extent of occurrence (EOO) falls within the Vunerable category under sub-criterion B1, whereas the area of occupancy (AOO) complies with the Endangered category under sub-criterion B2. The species is represented in herbaria by 27 specimens collected between 1969 and 1979, from 14 different sites, showing it is moderately common. Twelve collecting sites lie within protected areas (the Kibira National Park in Burundi, the Nyungwe National Park and the Gishwati-Mukura National Park in Rwanda, and the Kahuzi-Biega National Park in the Democratic Republic of the Congo). Two other sites occur on private land where the populations are liable to impact by a range of activities including trampling by livestock, clearing, logging, and wood harvesting. These threats lead us to estimate the number of locations at 7, and to infer a decline in habitat quality. Therefore, the species has been assessed as Vulnerable (VU).

Bibliography – Pichi Sermolli (1973, 1985), Roux (2009).



▲► *Asplenium centrafricanum* – Photos by Eberhard Fischer (©) taken on Mount Muzimu, Rwanda.

Asplenium reekmansii Pic.Serm.

RED LIST CATEGORY – **Critically Endangered (Possibly Extinct) (CR (PE))**.

IUCN CRITERIA – B2ab(iii,v)

DESCRIPTION – A terrestrial fern: rhizome erect or creeping for a short distance, with scales; fronds tufted, erect, rigid, up to 85 cm long; lamina oblong-lanceolate, ± 27-jugate; pinnae stipellate, apex long attenuate-caudate; sori with linear indusium.

HABITAT – It occurs on wet rocks in gallery forest, at 1900 m altitude.

DISPERSAL – Effective, with spores distributed by wind (anemochory) or water (hydrochory).

DISTRIBUTION – Only known from the Mulembwe River in south-western Burundi.

RED LIST PARAMETERS – EOO: Not applicable; AOO: 9 km^2; Number of locations: 1.

JUSTIFICATION – With only one locality where the species has been observed, it is not possible to calculate its extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. The species is only known from the type specimen, collected in 1976, and is thus considered to be very rare. Unfortunately, the single collecting locality lies on private land, where the natural vegetation is doomed to disappear due to human activities like clearing for the expansion of agricultural activities and wood harvesting, as well as livestock farming. The ongoing loss of habitat leads us to infer a continuing decline in habitat quality and in the number of

◄ ***Asplenium reekmansii*** – Scan of the isotype specimen (Reekmans 5122) at BR.

mature individuals. Therefore, based on the information above, the species has been listed as Critically Endangered (CR). Because of the nature of the threats and the fact that the species has not been reported for 40 years, the label Possibly Extinct (PE) has been added.

BIBLIOGRAPHY – Ntore & *al.* (2017a2), Pichi Sermolli (1985), Roux (2009).

Asplenium rukararense Hieron.

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B1ab(ii,iii,iv)+2ab(ii,iii,iv).

DESCRIPTION – A terrestrial or epiphytic fern; rhizome scaly, short, erect, fronds 22–70 cm long; stipe 6–23 cm long, with scales at the base; lamina lanceolate, bipinnate, with 9 to 25 pairs of pinnae, pinnae of 2nd order usually 1–2 times divided; sori elongate.

HABITAT – It occurs in montane moist forest and gallery forest, occasionally on road banks, at 1500–2650 m altitude.

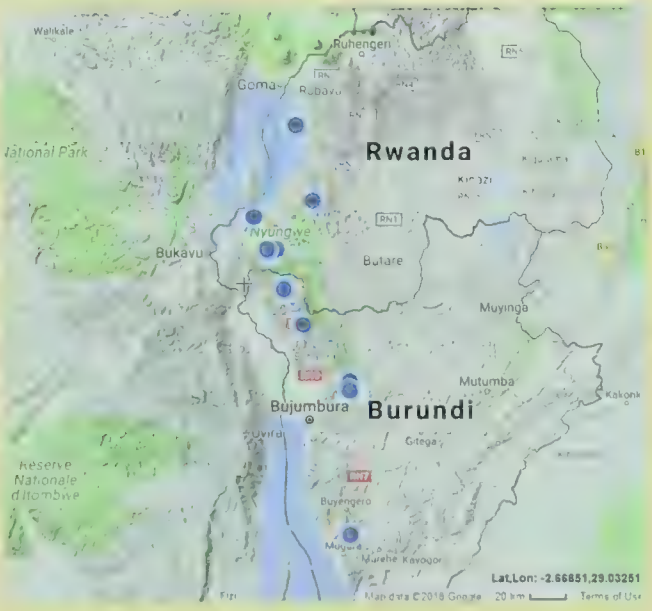
DISPERSAL – Effective, with spores distributed by wind (anemochory) or water (hydrochory).

DISTRIBUTION – Endemic to the Albertine Rift, occurring in western Burundi and western Rwanda.

Red List parameters – EOO: 4,896 km^2; AOO: 99 km^2; Number of locations: 5.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) both comply with the criteria for the Endangered category under sub-criteria B1 and B2. The fern is represented in herbaria by 13 specimens collected between 1907 and 1982 at 10 different sites, and can be considered as fairly rare. Five collecting sites occur within protected areas (the Bururi Forest Nature Reserve and the Kibira National Park in Burundi and the Nyungwe National Park in Rwanda). The five other sites occur on private land and are threatened by human activities such as clearing, expansion of the area of crop cultivation and, to a lesser degree, timber harvesting. These activities may contribute to an irreversible loss or degradation of habitat and lead us to estimate the number of locations at 5. They also lead us to infer a continuing decline in AOO, number of mature individuals and number of locations. Therefore, based on the above observations, the species has been assessed as Endangered (EN).

Bibliography Fischer & Killmann (2008), Hieronymus (1910), Ntore & *al.* (2017a3), Pichi-Sermolli (1985), Roux (2009).



◄ ***Asplenium rukararense*** – Photo by Eberhard Fischer (©) taken in the Kamiranzovu Swamp, Rwanda.

Blotiella bouxiniana Pic.Serm.

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

Description – A terrestrial fern; rhizome ascending; fronds tufted, up to 2 m long; lamina bipinnate to tripinnate; rachis of pinnae wingless, densely hairy; pinnae with reticulate veins; sori marginal, between the lobes.

Habitat – It occurs in wet montane forests, at 2500 m altitude.

Dispersal – Effective, with spores likely distributed by wind (anemochory).

Distribution – Endemic to the Congo-Nile Divide, occurring in north-western and south-western Burundi and in south-western Rwanda.

Red List parameters – EOO: 1,328 km^2; AOO: 63 km^2; Number of locations: 3.

▲ ***Blotiella bouxiniana*** – Photo by Eberhard Fischer (©) taken in the Kamiranzovu Swamp, Rwanda.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) both comply with the criteria for the Endangered category under sub-criteria B1 and B2. This species is known from 6 herbarium specimens collected between 1956 and 1974 and is thus considered to be rare. The collecting localities recorded from Rwanda are situated inside a protected area (the Nyungwe National Park), while the localities from Burundi lie on private land where the habitat is under threat of loss/degradation attributable to agricultural and pastoral activities. However, it seems likely to assume the species occurs in the Kibira National Park, which is contiguous with the Nyungwe National Park. The ongoing loss of habitat on the Burundian territory leads us to estimate the number of locations at 3. It also leads us to infer a continuing decline in extent and quality of habitat, in the number of locations and mature individuals, and thus also in EOO and AOO. Hence, based on the information above, the species has been listed as Endangered (EN).

Bibliography – Fischer & Killmann (2008), Ntore & *al.* (2017a4), Pichi Sermolli (1983), Roux (2009).

Pteridaceae

Pteris kivuensis C.Chr.

Red List category – **Least Concern (Conservation Dependent) (LC (CD))**.

Description – A terrestrial fern; rhizome erect, with lanceolate black scales with pale margins; fronds tufted, 0.6–1.4 m tall; stipe 0.5–1.0 m long, stramineous, its base densely covered with chestnut-coloured scales; lamina light green, coriaceous; pinnae gradually tapering upwards into a long tail, segments 3–5 mm wide at the middle, narrowing upwards into a long tail; upper sterile part of the fertile segments irregularly and minutely serrate

Habitat – It occurs in wet montane forests, at 1900–2570 m altitude.

Dispersal – Effective, with spores likely distributed by water (hydrochory) or by clinging to animal fur or bird feathers (epizoochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, south-western Rwanda and eastern Democratic Republic of the Congo.

Red List parameters – EOO: 3,052 km^2; AOO: 72 km^2; Number of locations: Not applicable.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits for the Endangered category under sub-criterion B1 and B2. This species is known from 20 herbarium specimens collected between 1971 and 2010 and can be considered

◄ ***Pteris kivuensis*** – Scan of a herbarium specimen (Lewalle 4540) at BR.

as moderately rare. All collecting sites lie inside protected areas (the Kibira National Park in Burundi, the Nyungwe National Park in Rwanda and the Kahuzi-Biega National Park in the Democratic Republic of the Congo). Thus, the species cannot be assessed into any threat category. Therefore, based on the information above, it has been listed as Least Concern (LC). Kamau (2012) arrived at the same conclusion. Because its entire occurrence is within protected areas, the label Conservation Dependent has been added (CD).

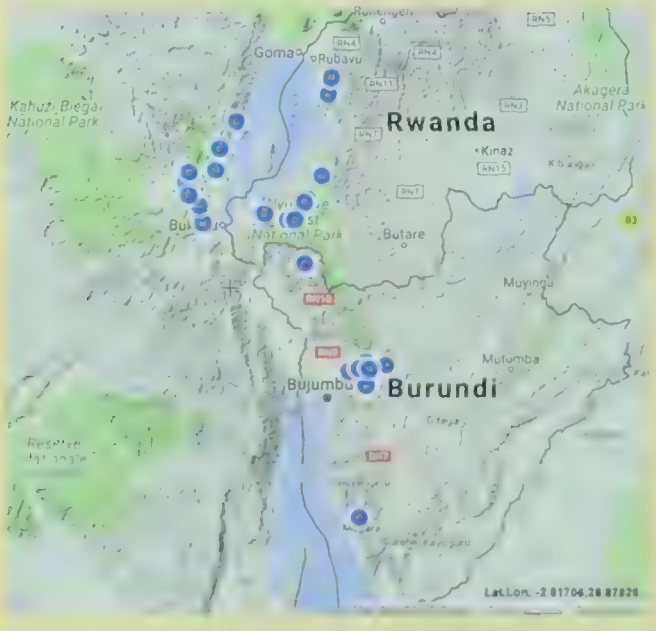
Bibliography – Kamau (2012), Ntore & *al.* (2017a5), Pichi Sermolli (1983), Roux (2009).

Vittaria reekmansii Pic.Serm.

Red List category – **Vulnerable (VU).**

IUCN criteria – B1ab(i,ii,iii,iv)+2ab(i,ii,iii,iv).

Description – A pendulous epiphytic fern, of 40–50(–100) cm long; rhizome short; scales lanceolate; fronds tufted; lamina simple, linear to linear, 10–30 cm long and 2–4 mm wide, base cuneate, apex cuspidate, veins reticulate; sori elongate, two per leaf, along the submarginal veins, indusium absent.



► *Vittaria reekmansii* – Photos by Eberhard Fischer (©) taken respectively at Uwinka and on Mount Bigugu, Rwanda.

Habitat – It occurs in forest, at 1650–2400 m altitude.

Dispersal – Effective, with spores probably distributed by wind (anemochory)

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, in western Rwanda and eastern Democratic Republic of the Congo.

Red List parameters – EOO: 13,238 km²; AOO: 104 km²; Number of locations: 10.

Justification – The extent of occurrence (EOO) falls within the limits of the Vulnerable category under sub-criterion B1 and the area of occupancy (AOO) falls within the limits of the Endangered category under sub-criterion B2. The species is known from 44 herbarium specimens, collected between 1969 and 2011, and may be considered as moderately common. Many of its collecting sites are located inside protected areas (the Kibira National Park in Burundi, the Gishwati Mukura National Park and the Nyungwe National Park in Rwanda and the Kahuzi-Biega National Park in the Democratic Republic of the Congo), while other populations occur on private land and are affected by human disturbance and at risk attributable to deforestation for agriculture, land clearing, livestock damage and firewood harvesting. This threat of habitat loss leads us to estimate the number of locations at 10 and to predict a continuing decline in extent and quality of the habitat, number of locations and mature individuals and thus, also of EOO and AOO. Based on the above observations, the species has been listed as Vulnerable (VU).

Bibliography – Fischer & Killmann (2008), Ntore & *al.* (2017a6), Pichi Sermolli (1977, 1983), Roux (2009).

Selaginellaceae

Selaginella lewalleana Bizzarri

Red List category – **Endangered (EN)**.

IUCN criteria – B1(iii,v)+2ab(iii,v).

Description – Stems procumbent, up to 40 cm long, secondary and tertiary branches interwoven; leaves dimorphic, ciliate, the median leaves rounded, up to 0.25 cm long, cordate at base, the lateral leaves ovate to lanceolate, 0.4 cm long, auriculate at base; strobili up to 1.5 cm long, at the apex of ultimate branches; sporophylls similar to the median leaves.

Habitat – It occurs in montane moist forest, on wet ground, damp rocks, marshy places or escarpments, at an elevation of 1500–2000 m.

Dispersal – Effective, with spores distributed by water (hydrochory), but also by clinging to animal fur or bird feathers (epizoochory).

Distribution – Endemic to the Albertine Rift, occurring in north-western Burundi and south-western Rwanda.

Red List parameters – EOO: 377 km^2; 90 km^2; Number of locations: 2.

Justification – The extent of occurrence (EOO) and its area of occupancy (AOO) both comply with the criteria for the Endangered category under sub-criteria B1 and B2. This species is known from 12 herbarium specimens, collected between 1960 and 1978 and is considered as rare, though it can be locally common. Most of the collecting localities fall inside a protected area (the Nyungwe National Park in Rwanda). The two other ones known from Burundi lie on private land where the forest inhabited by the species is undergoing clearing

for gold mining and agriculture. However, it seems likely to assume the species occurs in the Kibira National Park, which is contiguous to the Nyungwe National Park. This pressure upon the environment leads us to presume that the species occurs at 3 locations and to infer a continuing decline in habitat quality and in the number of mature individuals. Therefore, based on the above information, the species has been listed as Endangered (EN).

Bibliography – Bizzarri (1981), Fischer & Killmann (2008), Ntore & *al.* (2017a7), Pichi Sermolli (1983), Roux (2009).

▲ ***Selaginella lewalleana*** – Photo by Eberhard Fischer (©) taken at Gisakura, Rwanda.

Thelypteridaceae

Cyclosorus burundensis (Pic.-Serm.) Mazumdar & Mukhop.

Red List category – **Critically Endangered (Possibly Extinct) (CR (PE))**.

IUCN criteria – B2ab(iii,v).

Synonyms – *Christella burundensis* Pic.Serm.

Description – A terrestrial fern; rhizome erect, slender, with triangular-falcate scales; fronds tufted, up to 58 cm long; stipe 29–31 cm long; lamina ovate, 1-17-jugate; pinnae oblong, 8–9 × 1.5 cm, pinnatipartite; sori with kidney shaped indusium.

Habitat – It occurs in montane forest, at 1700 m altitude.

Dispersal – Fairly effective, with spores likely distributed by water (hydrochory)

Distribution – Only known from south-western Burundi.

Red List parameters – EOO: Not applicable; AOO: 9 km^2; Number of locations: 1

Justification – With only one collecting site where the species has been observed, it is not possible to calculate its extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits of the Critically Endangered category (CR) under sub-criterion B2. The species is

► ***Cyclosorus burundensis*** – Scan of the holotype (Pichi Sermolli 6983) at FI.

known from a single herbarium specimen collected in 1966 and should be considered as very rare. Unfortunately, this collecting site occurs on private land which shows a strong impact of human disturbance. Thus, the species is under great threat of habitat loss due to agriculture and heavy grazing and trampling by cattle. The loss of habitat leads us to infer a continuing decline in quality of habitat and eventual remaining number of mature individuals. Based on the above observations, the species is listed as Critically Endangered (CR). Because of the high threat at the single site where it occurs, and the fact that it has not been observed for 50 years, the label Possibly Extinct (PE) has been added.

Bibliography – Mazumdar & Mukhopadhyay (2013), Ntore & *al.* (2017a8), Pichi Sermolli (1983), Roux (2009).

Woodsiaceae

Athyrium lewalleanum Pic.Serm.

Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(iii,iv).

Description – A terrestrial fern with long creeping rhizome and pale brown scales; fronds

few, paired or solitary, 15–40 cm tall; lamina triangular-hastate in outline, essentially trifid, apical part with 12 or more pinnae; sori round, indusium subreniform.

HABITAT – It occurs in evergreen forest along streams and rivers, at 900–1200 m altitude.

DISPERSAL – Effective, with spores probably distributed by wind (anemochory).

DISTRIBUTION – Endemic to north-western Burundi (Bubanza, road to Mabaye, River Nyamagana) and north-western Tanzania (Kigoma District, Kasye Forest).

RED LIST PARAMETERS – EOO: not applicable; AOO: 18 km²; Number of locations: 2.

◄ ***Athyrium lewalleanum*** – Habit (A), rhizome scale (B), ultimate segment (C), sorus (D, E), hair from lower surface of frond (F). Drawing by L. De Floriani, Instituto Botanico dell'Università, Perugia (©), reproduced with permission from Pichi Sermolli (1973).

JUSTIFICATION – With only two sites where the species has been observed, it is not possible to calculate its extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits of the Endangered category under sub-criterion B2. The species is only known from three specimens, collected in between 1969 and 1994, and is thus considered to be very rare. Unfortunately, all collecting localities lie on private land, where the natural vegetation is doomed to disappear due to human activities like clearing for the expansion of agricultural activities and wood harvesting, as well as livestock farming. The ongoing loss of habitat leads us to infer a continuing decline in habitat quality and in the number of mature individuals. Therefore, based on the information above, the species has been listed as Endangered (EN).

BIBLIOGRAPHY – Pichi Sermolli (1973, 1985), Verdcourt (2003).

SPERMATOPHYTA
DICOTYLEDONAE

Acanthaceae

Anisosepalum lewallei Bamps

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B1ab(i,ii,iii,iv)+2ab(i,ii,iii,iv).

DESCRIPTION A perennial herb forming large clumps, with numerous stems arising from creeping and branched rhizomes; stems ascending to erect, to 1 m tall; leaves in whorls of 3; flowers pale violet.

◄ ***Anisosepalum lewallei*** – Photos by Eberhard Fischer (89) taken at Kumuyange, Burundi.

Habitat - In Tanzania, it is found at 1675 m elevation where it grows in small patches of submontane primary rain forest with permanent springs, dominated by *Syzygium owariense*. In Burundi, it occurs between 1750 and 2000 m elevation where it grows in gallery forest and in patches of swamp forest between cushions of *Sphagnum* spp.

Seed dispersal – Limited, by means of explosive capsules (ballochory).

Distribution – Known from southern Burundi (Kwitaba, Kumuyange and Rwamunyinya hills) and western Tanzania (Uzondo Plateau).

Red List parameters – EOO: 317 km^2; AOO: 24 km^2; Number of locations: 2.

Justification - The extent of occurrence (EOO) and the area of occupancy (AOO) both comply with the criteria for the Endangered category under sub-criteria B1 and B2. This species is known from 9 herbarium specimens collected between 1971 and 2000. The species seems to be bound to a specific habitat and because of the large distance between the Burundi and the Tanzanian populations, those two are likely to be genetically isolated. Unfortunately, none of the subpopulations lie within a protected area; and the species is under serious threat of habitat loss caused by deforestation for conversion to agricultural land, grazing surface for livestock, and logging for timber. The threat is thought to be particularly high in southern Burundi where there is an increasing human pressure on the habitat. The ongoing loss of habitat leads us to predict a continuing decline in number of mature individuals, as well as in EOO and AOO. By considering this threat, 2 locations should be identified. *S. lewallei* was previously assessed by Luke & *al.* (2015) as Endangered under criteria B (EN B1ab(i,ii,iii,iv)+2ab(i,ii,iii,iv)). This assessment is thus here confirmed.

Bibliography – Bamps (1972), Champluvier (1991), Lebrun & Stork (1997), Luke & *al* (2015), Vollesen (2008).

Barleria superata I.Darbysh.

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

Description – A dwarf shrub with several stems of 20–40 cm tall, arising from a woody rootstock; leaves glabrous except for long ascending hairs along the margin and midrib, inflorescence axillary.

Habitat – This species is confined to fire prone woodlands. It was collected from recently burnt wooded grassland with *Hymenocardia* and from lightly wooded grassland over heavily eroded soils and areas of exposed dolomitic rock, at 1550 m altitude. Fire almost certainly plays an important role in the ecology of this species.

Seed dispersal – Limited, by means of explosive capsules (ballochory).

Distribution – Endemic to southern and eastern Burundi.

Red List parameters – EOO: 616 km^2; AOO: 27 km^2; Number of locations: 3.

Justification – Due to its small area of occupancy (< 20 km²) and its location outside of protected areas, in a region with strong demographic growth, this species was previously assessed as Vulnerable by Darbyshire (2011) based on sub-criterion D2. The current extent of

► ***Barleria superata*** – Habit (A), flowering branch (B), stem indumentum (C), lower leaf surface (D), dissected calyx with bracteole (E), opened corolla with stamens and pistil (F), ovary (G), capsule valves (H). Drawing by Andrew P. Brown (©), reproduced with permission from Darbyshire (2011).

occurrence and the area of occupancy both comply with the Endangered category under sub-criteria B1 and B2. This species is clearly scarce, being known from only three collections recorded between 1951 and 1981, all situated outside of protected areas. Its wooded grassland habitat is under intense pressure predominantly by conversion to agriculture (notably the development of sugar cane and cotton growing in Mosso), cattle pasture, timber plantations, and urbanization (in Gihofi and Kinyinya). Its habitat is also severely modified by logging and the suppression of seasonal fires on which it seems to depend. This ongoing habitat loss leads us to predict a continuing decline in the number of locations, extent and/or quality of habitat, mature individuals and also of its EOO and AOO. This threat could rapidly affect all individuals present in the 3 locations. One may even wonder if the species is not already extinct. The above information leads us to adjust the previous assessment to Endangered (EN).

Bibliography – Darbyshire (2011), Ntore & *al.* (2017a9).

Blepharis burundiensis Vollesen

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

Description – A perennial herb up to 40 cm tall, with creeping stems carrying radicant leaves; spikes solitary, sessile, persistent when mature; bracts terminating in a straight bristle; flowers blue to purplish.

Habitat – It grows in savannah palm groves, ranging between 800 and 850 m altitude.

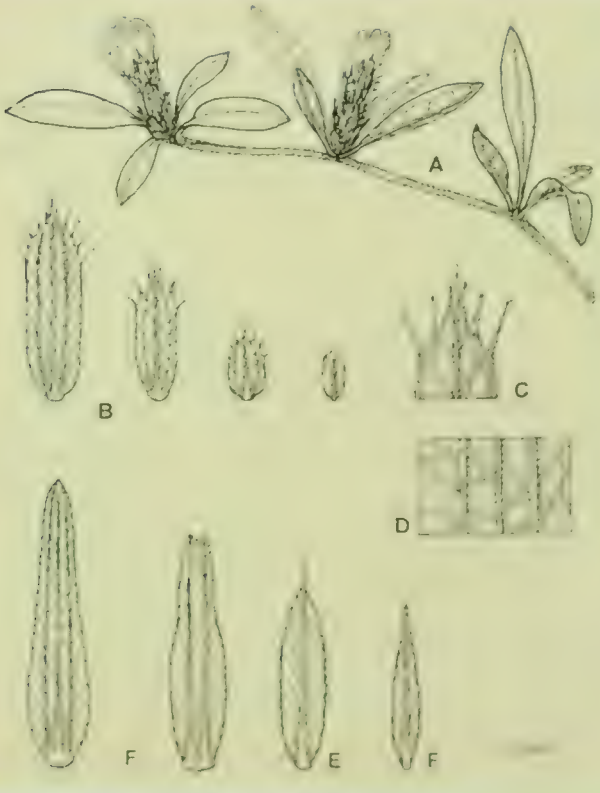
Seed dispersal – Limited, by means of explosive capsules (ballochory).

DISTRIBUTION – Only known from the Rusizi Plain in western Burundi and eastern Democratic Republic of the Congo.

RED LIST PARAMETERS – EOO: 214 km^2; AOO: 63 km^2; Number of locations: 3.

JUSTIFICATION – The size of the extent of occurrence (EOO) and area of occupancy (AOO) both comply with the criteria for the Endangered category under sub-criteria B1 and B2. This species is poorly represented in herbaria by 16 specimens and has not been collected since 1993. Unfortunately, all collecting sites lie outside protected areas, in a region where the long-term survival of the species is under inferred severe threat from high human population growth and the resulting high pressure upon the natural environment. The main threat is habitat conversion, mainly to agricultural land but also to urban development, but also the effects of significant trampling of the herbaceous cover by big herds of cattle wandering throughout the Rusizi Plain. As its habitat is continuously and rapidly declining in both extent and quality, the number of subpopulations and mature individuals are assumed to be declining as well. Some previously recorded collecting sites may actually already have disappeared due to the effects mentioned above. The habitat loss is able to seriously and quickly affect the individuals occurring at all 3 locations. Based on the above observations, this species is assessed as being Endangered (EN).

BIBLIOGRAPHY – Vollesen (2000), Ntore & *al.* (2017a10).



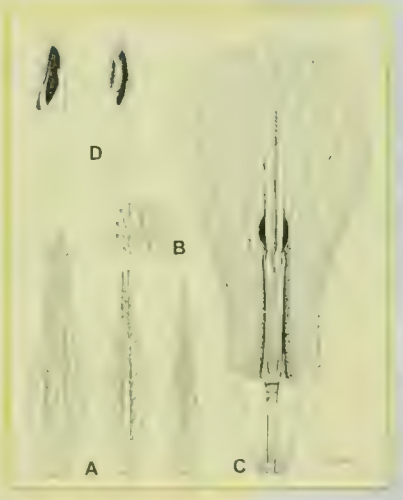
◄ ***Blepharis burundiensis*** – Habit (A), series of bracts (B), apical part of inner bract (C), detail of surface dorsal sepal (D), bracteole (E), sepals (F). Drawing by Margaret Tebbs (A), reproduced with permission from Vollesen (2000).

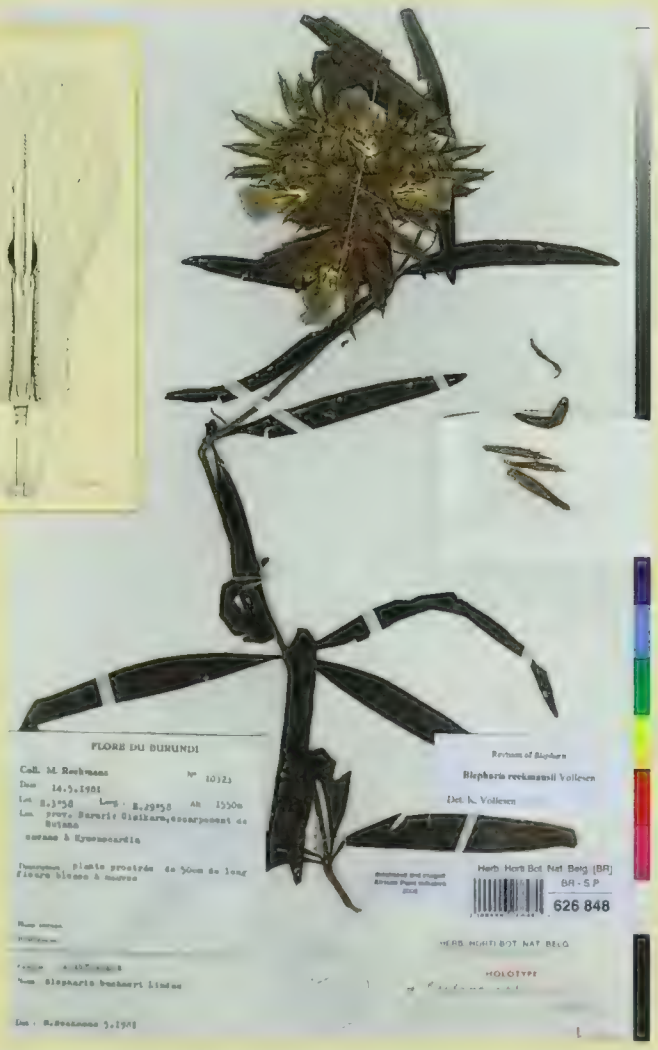
Blepharis reekmansii Vollesen

RED LIST CATEGORY – **Critically Endangered (Possibly Extinct) (CR (PE))**.

IUCN CRITERIA – B2ab(iii,v).

DESCRIPTION – A procumbent perennial herb, with several unbranched stems from a woody rootstock; stems up to 50 cm tall; leaves, bracts and sepals entire, with stalked capitate glands, dorsal sepal without or with 1(–2) lateral teeth per side; corolla with an indistinctly lobed limb.





► ***Blepharis reekmansii*** – Scan of the holotype specimen (Reekmans 10323) at BR; sepals (A), detail of surface of dorsal sepal (B), corolla opened up (stamens removed) (C), stamens (D). Drawing by Margaret Tebbs (©), reproduced with permission from Vollesen (2000).

HABITAT – The species inhabits rocky areas in submontane grasslands with *Hymenocardia*, on rocky escarpments at 1550 m altitude.

SEED DISPERSAL – Limited, by means of explosive capsules (ballochory).

DISTRIBUTION – Endemic to south-eastern Burundi, where it is only known from Rutana on the Gisikara escarpment.

RED LIST PARAMETERS – EOO: not applicable; AOO: 9 km^2; Number of locations: 1.

JUSTIFICATION – With only a single recorded occurrence, the extent of occurrence (EOO) can not be assessed. The size of the area of occupancy (AOO) falls within the limits of the Critically Endangered category under sub-criterion B2. This species is currently known from a single herbarium specimen collected in 1981. The fact that it has not been re-collected in

this well-collected area suggests that it is rare. Moreover, its single collecting locality lies outside any protected area, in a region where the survival of the species is under inferred severe threat from high human population growth, resulting in high pressure upon the natural environment. Being situated in an agricultural area with an ever-increasing population, the site is threatened by habitat degradation due to expansion of pastoral activities and exotic timber plantations. This ongoing loss of habitat quality leads us to predict a continuing decline in number mature individuals. All of the above bodes ill for its survival, and it might actually even be extinct already. Therefore, based on the above information, the species has been classified as Critically Endangered (CR). Because of the fair change that, after a thorough check of its only known occurrence site, it will have to be transferred to the category Extinct in the Wild (EW), the additional tag Possibly Extinct (PE) has been added.

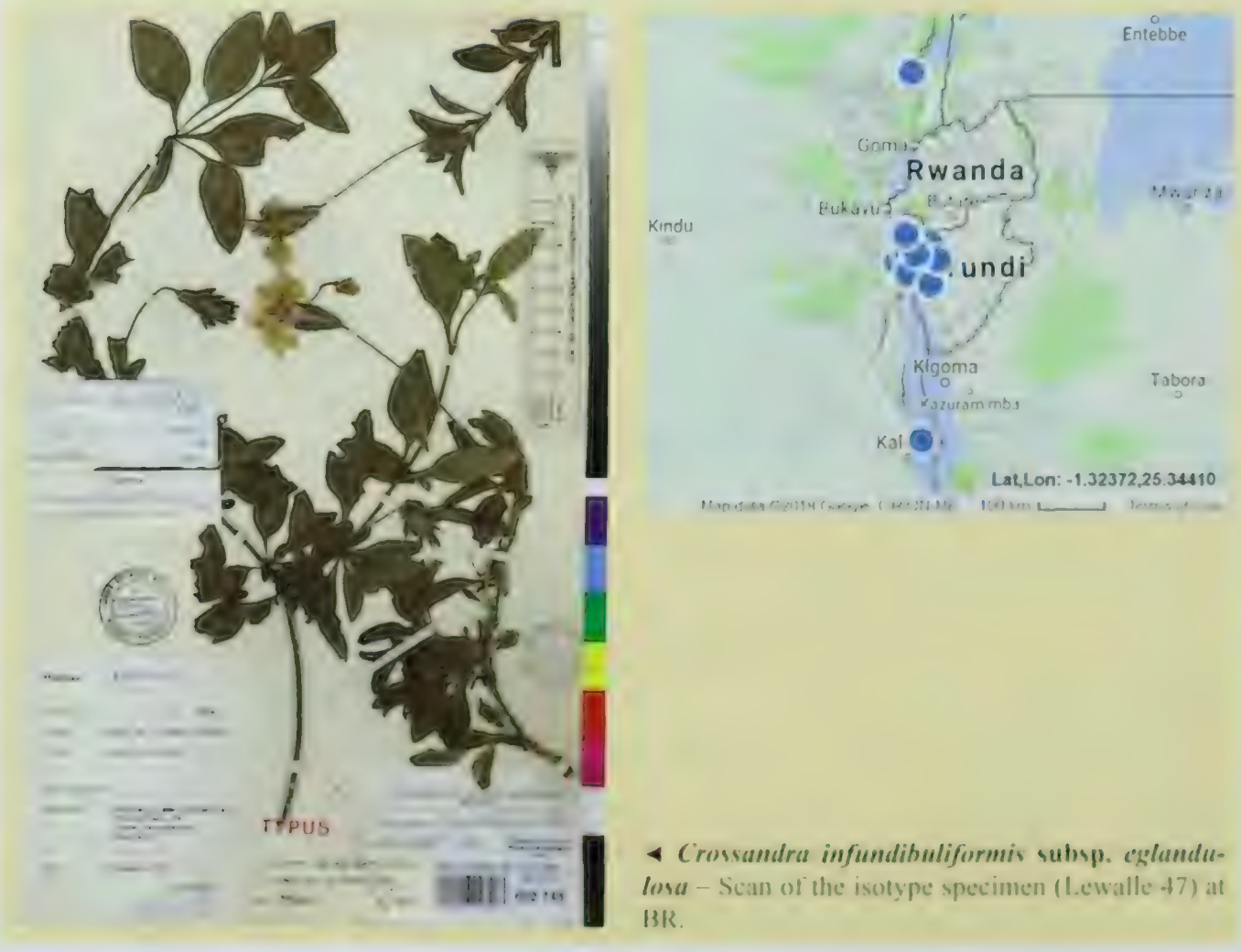
BIBLIOGRAPHY – Ntore & *al.* (2017a11), Vollesen (2000).

Crossandra infundibuliformis (L.) Nees subsp. *eglandulosa* Vollesen

RED LIST CATEGORY – **Vulnerable (VU).**

IUCN CRITERIA – B1ab(i,ii,iii)+B1ab(i,ii,iii).

DESCRIPTION A shrub, ± crawling or erect, of up to 1–1.5 m tall; bracts gradually narrowed to the tip, lacking capitate glands; corolla fan-shaped, red to salmon or orange.



◄ ***Crossandra infundibuliformis* subsp. *eglandulosa*** – Scan of the isotype specimen (Lewalle 47) at BR.

Habitat – This subspecies grows in wooded grassland, between 800 and 2000 m altitude.

Seed dispersal – Limited, by means of explosive capsules (ballochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi and eastern Democratic Republic of the Congo.

Red List parameters – EOO: 16,995 km^2; AOO: 162 km^2; Number of locations: 9.

Justification – The extent of occurrence (EOO) falls within the threshold of the category Vulnerable under sub-criterion B1, while its area of occupancy falls within the limits for the Endangered category under sub-criterion B2. This subspecies is known from 24 herbarium specimens collected between 1895 and 1982. Two collecting localities, Mtowa in the south-east, and between Lubelo and Luofu in the north-east, both in the Democratic Republic of the Congo, are geographically isolated. Only two collecting localities lie within protected areas, the Kibira National Park and the Rusizi Natural Reserve in Burundi. In 2000, the status of latter was downgraded from being a Park to a Natural Reserve in which human activities are allowed. Conversion of natural vegetation to agriculture and timber plantations significantly alters the native habitat upon which this taxon depends. Furthermore, logging and settlements are strongly affecting the habitat and likely to be the primary threat to the subspecies. These threats are likely to seriously and quickly affect the individuals occurring at all 9 locations. Considering its rather restricted distribution in an area under threat, this subspecies is best classified as Vulnerable (VU).

Note – This taxon is one of five subspecies which compose the species *C. infundibuliformis*, four of which have a relatively small distribution area in tropical Africa while the fifth, subsp. *infundibuliformis*, is widely distributed and known from tropical Asia and is regularly cultivated as a garden plant. Its EOO, AOO and and number of locations more than 10 are far exceeding the upper limits for any threat category and thus is Least Concern (LC) (Ntore & *al.*, 2017b1).

Bibliography – Ntore & *al.* (2017b1, 2017b2), Vollesen (1990).

Justicia amanda Hedrén subsp. ***amanda***

Red List category – **Vulnerable (VU)**.

IUCN criteria – B2ab(ii,iii,iv,v).

Description – A prostrate herbaceous plant, with stems reaching 1 m in length; corolla pink with a darker pattern, 15–18 mm long; anthers with a narrow appendix.

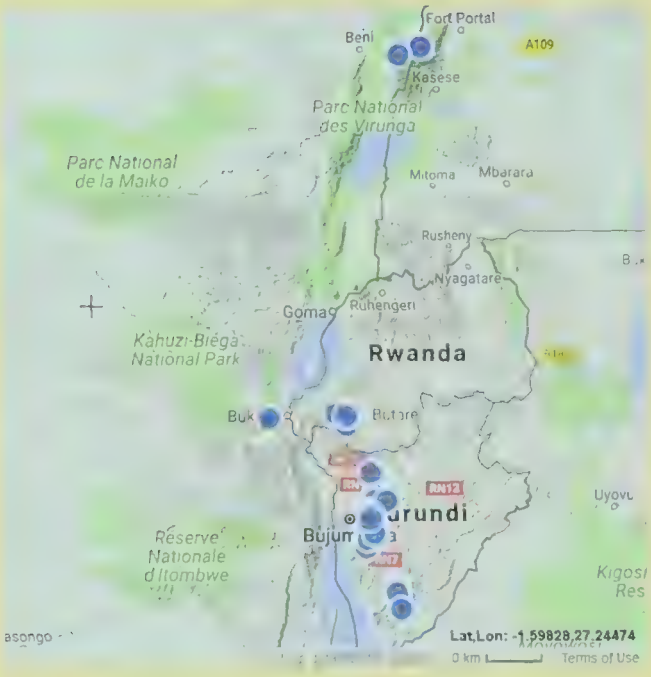
Habitat – It grows in montane forest, gallery forest and grassland, between 1750 and 2550 m altitude.

Seed dispersal – Limited, by means of explosive capsules (ballochory).

Distribution – Endemic to the Albertine Rift, in western and south-western Burundi, in south-western Rwanda, in western Uganda and in the eastern part of the Democratic Republic of the Congo.

Red List parameters – EOO: 5,533 km^2; AOO: 207 km^2; Number of locations: 7.

Justification – The size of the extent of occurrence (EOO) falls outside any threat category,



▲ ***Justicia amanda*** **subsp. *amanda*** – Photo by Eberhard Fischer © taken at Rwasenkoko Swamp, Rwanda.

but the area of occupancy (AOO) complies with the Endangered category. Since this taxon has been collected 37 times between 1948 and 1982, it might be considered as relatively abundant. Moreover, it is present in several protected areas in Burundi (the Kibira National Park), in Rwanda (the Nyungwe National Park), and in the Democratic Republic of the Congo (the Kahuzi-Biega National Park and the Virunga National Park). The subspecies was also collected outside of protected areas where meanwhile its upland forest habitat has been lost or strongly degraded by human activities. The habitat disturbance allows us to infer an ongoing decline in AOO, EOO, extent and or quality of habitat, locations, and number of mature individuals. This disturbance could seriously and quickly affect all individuals occurring at 7 locations. Hence, based on the above information, this subspecies can be considered as Vulnerable (VU).

Note – The species *Justicia amanda* comprises two subspecies: subsp. *savatilis* Champl. & Parmentier, which is endemic to Equatorial Guinea and Gabon, and subsp. *amanda* which is assessed above. The species as whole has an EOO of 568,904 km² and AOO of 216 km², while its number of locations is less than 10. It has been assessed as Vulnerable (VU B2ab(ii,iii,iv,v)).

Bibliography – Hedrén (1988), Ntore & *al.* (2017a12).

Justicia pseudotenella Champl. & Vollesen

Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(ii,iii,iv,v).

Description – A herb of 19–40 cm tall, with a stem that is erect but ascending at base; bracts elliptic with an acute apex; inflorescence a short spike; corolla white

Habitat – It grows in evergreen forest along streams and in gallery forest, at 1100–1900 m elevation

Seed dispersal – Limited, by means of explosive capsules (ballochory).

Distribution – Known from the Siguvyaye Valley in south-western Burundi and from the Ntakatta Forest in western Tanzania.

Red List parameters – EOO: not applicable; AOO: 18 km^2; Number of locations: 2.

◄ ***Justicia pseudotenella*** – Habit (A), larger leaf (B), bract (C), calyx (D), opened corolla (E), pistil (F). Drawing by Antonio Fernandez, Botanic Garden Meise (©).

Justification – With only two collecting sites, the extent of occurrence cannot be calculated. The size of the area of occupancy (AOO) falls within the thresholds for the Endangered category under sub-criterion B2. This species is poorly known and thought to be rare. In fact, it is known from only two herbarium specimens collected in 1974 and 2000 respectively, in two localities quite far apart. One of the localities lies within a protected area (the Mahale Mountains National Park in Tanzania). Unfortunately, its locality in Burundi is under high human pressure. Conversion of gallery forests for expanding agriculture, grazing land for livestock and logging cause loss of suitable habitat and put pressure on the survival of this species. By considering this threat, 2 locations are defined, in which all individuals can be rapidly and severely affected. As such, we estimate a continuous decline in quality and extent of habitat, in the number of locations and mature individuals as well as in AOO. Based on the above information, the species is listed as Endangered (EN).

Bibliography – Champluvier (2013), Ntore & *al.* (2017a13).

Justicia violaceotincta Champl.

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(iii)+2ab(iii).

Description – A herb or dwarf shrub of 60–90 cm tall; bracts ovate-subcordate, violet; corolla pink.

► ***Justicia violaceotincta*** – Flowering stem (A), mid shoot leaf (B), pubescence of lower leaf surface (C), idem, upper leaf surface (D), detail of upper leaf surface showing cystoliths (E), part of inflorescence with external bract and flower removed, external bract (G), outermost of the internal bracts (H), bracteole (I) flower with bracteoles (J), opened corolla (K), anther and top of filament (dorsal view) (L), pistil and disc (M). Drawing by Antonio Fernandez, Botanic Garden Meise (©).

Habitat – It occurs in montane rain forest, between 1200 and 2000 m elevation.

Seed dispersal – Limited, by means of explosive capsules (ballochory).

Distribution – Endemic to the Albertine Rift, occurring in north-western Burundi, south-western Rwanda and the north-east of the Democratic Republic of the Congo.

Red List parameters – EOO: 1,503 km²; AOO: 45 km²; Number of locations: 4.

Justification – The size of the extent of occurrence (EOO) and of its area of occupancy (AOO) both comply with the criteria for the Endangered category under sub-criteria B1 and B2. It is poorly represented in herbaria by 8 specimens, the most recent collected in 1981, and could be considered as rare. Two out of the five collecting sites lie inside protected areas (the Kibira National Park in Burundi and the Nyungwe National Park in Rwanda), while three

others are situated in areas heavily impacted by human pressure. In those areas, the species is under inferred threats of habitat loss due to deforestation for agriculture and pastoral pasture, and also logging. Those threats are likely to result in a rapid continuing decline of its extent and/or quality of habitat. By considering clearing and agriculture, 4 locations, in which all individuals could be rapidly and severely affected, are defined. Based on the above observations, the species is listed as Endangered (EN).

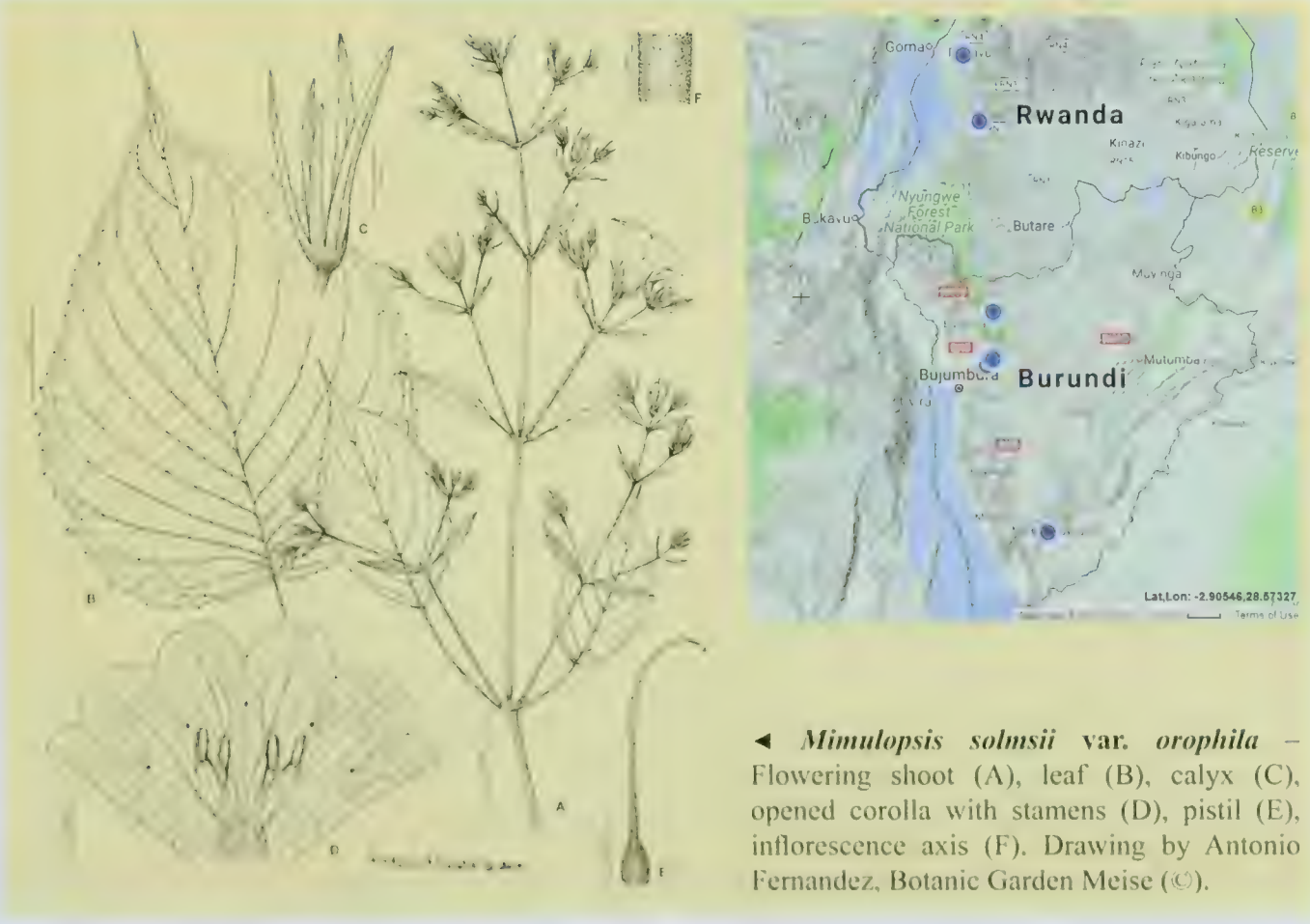
Bibliography – Champluvier (1998), Ntore & *al.* (2017a14).

Mimulopsis solmsii Schweinf. var. ***orophila*** Troupin

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

Description – An erect shrub of 2–3 m tall, differing from typical *Mimulopsis solmsii* in the lack of glandular hairs.



◄ ***Mimulopsis solmsii*** **var. *orophila*** – Flowering shoot (A), leaf (B), calyx (C), opened corolla with stamens (D), pistil (E), inflorescence axis (F). Drawing by Antonio Fernandez, Botanic Garden Meise (©).

Vernacular names – Ubukokobwinzira (in kirundi).

Habitat – It occurs in the undergrowth of montane and gallery forest, between 2000 and 2500 m altitude.

Seed dispersal – Limited, by means of explosive capsules (ballochory).

Distribution – Known only from the Congo-Nile Divide in southern and western Burundi, and western Rwanda.

Red List parameters – EOO: 2,811 km^2; AOO: 27 km^2; Number of locations: 4.

Justification – The extent of occurrence (EOO) and area of occupancy (AOO) both comply with the criteria for the Endangered category under sub-criteria B1 and B2. It is known from only 6 herbarium specimens collected between 1976 and 1979 which suggests that it is uncommon. Only one collecting site is located within a protected area, the Kibira National Park in Burundi, while another one occurs in close proximity of the Park. Unfortunately, most collecting sites are in areas under great threat of ongoing habitat loss caused mainly by deforestation for agriculture and logging. This loss of habitat causes a continuing decline in the number of locations and mature individuals and thus, also of its EOO and AOO. Considering deforestation, the variety can be considered to occur at 3 locations. Based on the above observations, the variety is listed as Endangered (EN).

Note – The species *Mimulopsis solmsii* contains two varieties. In his treatment of the Acanthaceae of tropical East Africa, Vollesen (2008) did not recognize the var. *orophila*, but included it in the species *M. solmsii*. However, the Acanthaceae specialist D. Champluvier (at BR) is preparing a manuscript where she will raise it to distinction at species level. *M. solmsii* is as a whole widely distributed in tropical Africa. Its EOO, AOO and number of locations are far exceeding the upper limits for any threat category and thus, is classified as Least Concern (LC).

Bibliography – Champluvier (1985), Troupin (1982).

Annonaceae

Monanthotaxis orophila (Boutique) Verdc.

Red List category – **Near Threatened (NT)**.

Synonyms – *Popowia orophila* Boutique

Description – A scandent woody liana with stems up to 10 m long; flowers solitary, calyx divided into 3 triangular lobes; petals greenish, succulent; fruits with 7–10 orange-red carpels

Vernacular names – Umukurura (in kirundi).

Habitat – It grows in upland forest, at 1900–2520 m altitude.

Seed dispersal – Unknown, probably by birds and/or mammals who eat the fruits (endozoochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, western Rwanda, eastern Democratic Republic of the Congo and south-western Uganda.

Red List parameters – EOO: 33,668 km^2; AOO: 270 km^2; Number of locations: 11.

Justication – The extent of occurrence (EOO) is exceeding the 20,000 km^2 upper limit for a Vulnerable status under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits of the Endangered category under sub-criterion B2. It is represented by

► ***Monanthotaxis orophila*** – Photos by Eberhard Fischer (©) taken in the Kamiranzovu Swamp, Rwanda.

48 specimens in herbaria collected between 1929 and 1999; and might be considered as relatively common. This species is present within five protected areas across its range (the Kahuzi-Biega National Park in the Democratic Republic of the Congo, the Kibira National Park in Burundi, the Nyungwe National Park and the Gishwati-Mukura National Park in Rwanda, and the Bwindi Impenetrable National Park in Uganda). It also occurs in several non-protected areas where human activities have a strong impact on its upland forest habitat, particularly in Burundi. A few tracts of forests ideal for the species have been lost due to conversion of land to agricultural production and pastures, as well as intensive harvesting of wood for fire and construction. Considering the most serious plausible threats affecting the species, this latter is believed to occur at 11 locations, which is just above the upper limit for the Vulnerable category. Then, the necessary two conditions required to apply sub-criterion B2 are not present and hence the species cannot be assessed into any threat category. However, based on the above information, the species is assessed as Near Threatened (NT).

Bibliography Boutique (1951), Killmann & Fischer (2008), Reekmans & Niyongere (1986), Ntore & *al.* (2017f1), Verdcourt (1971).

Pimpinella robynsii C.Norman

Red List category – **Critically Endangered (Possibly Extinct) (CR (PE)).**

IUCN criteria – B2ab(iii).

Description - A robust erect herb of ca 2 m tall; stem rounded, glabrous, little branched above; leaves with obovate leaflets with a serrate margin; umbels with yellow flowers.

Vernacular names – Akanywabuki (in kirundi).

Habitat – It occurs in a river valley, at 1700 m altitude.

Seed dispersal – Limited and diffuse, probably by ants (myrmechory).

Distribution - Currently only known from northern Burundi, where it occurs in the valley of the Kanyaru river, in the area surrounding the village Rubura.

◄ ***Pimpinella robynsii*** – Scan of the holotype specimen (Robyns 2406) at BR.

RED LIST PARAMETERS – EOO: not applicable; AOO: 9 km^2; Number of locations: 1.

Being known from a single locality, the extent of occurrence (EOO) cannot be calculated. The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. It is known from only a single specimen collected in 1926 and is thought to be very rare. The specimen was recorded from a now densely and heavily populated area. Moreover, as its natural suitable valley habitat has been lost due to agriculture, and it has not been recorded since 90 years, it is actually likely to be extinct. Therefore, based on the above information, this species is assessed as Critically Endangered (CR), Possibly Extinct (PE).

BIBLIOGRAPHY – Bureau Central du Recensement (2011), Norman (1932), Ntore & *al.* (2017a16).

Asteraceae

Anisopappus burundiensis Lisowski

RED LIST CATEGORY – **Critically Endangered (Possibly Extinct) (CR (PE)).**

IUCN CRITERIA – B2ab(iii).

Anisopappus burundiensis – Scan of the holotype specimen (Lewalle 1939) at BR.

Description – An annual, aromatic, erect herb, of 20 -25 cm tall, leaves palmatifid; receptacle with carinate scales; ligular flowers white-cream; tubulate flowers yellow; pappus absent.

Habitat – It grows in grassland on laterite, at 1700 m altitude.

Seed dispersal – Limited, by means of smooth achenes (nutlets) without pappus (autochory).

Distribution – Known only from Gitega in central Burundi.

Red List parameters – EOO: not applicable; AOO: 9 km^2; Number of locations: 1.

Justification – Being known from a single locality, the extent of occurrence (EOO) cannot be calculated. The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. It is known from a single specimen collected in 1967 and thus it appears to be very rare. Since then, the collecting locality has become densely populated and heavily cultivated which resulted to a severe loss of its grassland habitat. Based on the above observations, the species is thought to be on the verge of extinction, if not already extinct, and is listed as Critically Endangered (CR), Possibly Extinct (PE). A visit to the collecting area is needed to confirm its extinction in the wild. This assessment confirms the one carried out earlier by the IUCN SSC Eastern African Plant Red List Authority (2013a).

Bibliography – IUCN SSC Eastern African Plant Red List Authority (2013a), Lisowski (1988, 1989).

Bidens burundiensis Mesfin

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(iii)+2ab(iii).

Description – An erect perennial herb of 0.2–1 m tall; basal leaves rosulate, simple to pinnatifid; receptacular scales membranous, yellowish, oblong to oblong-elliptic; ligular and tubular flowers yellow.

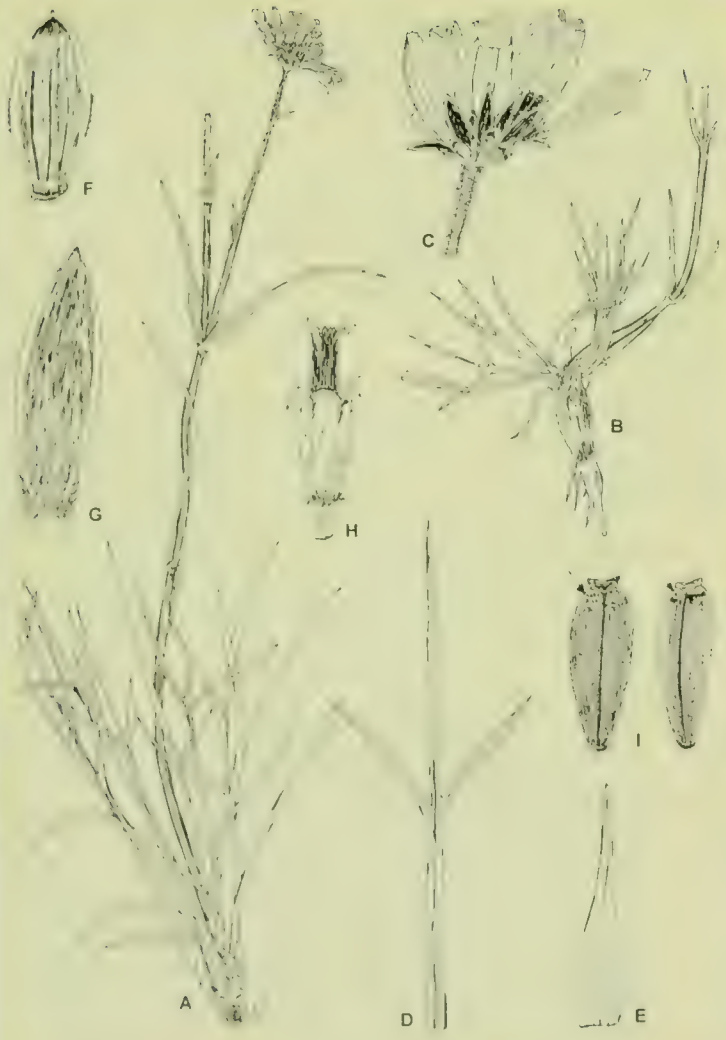
Habitat – It occurs in rocky grassland and Ericaceous shrub stands, between 1800 and 2650 m altitude.

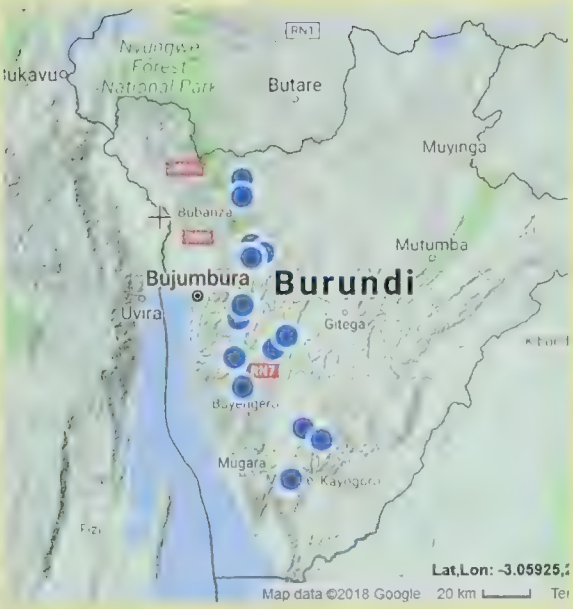
Seed dispersal – Limited, by means of virtually smooth nutlets without pappus or bristles (autochory).

Distribution – Known only from the Congo-Nile Divide, in western and southern Burundi.

Red List parameters – EOO: 2,081 km^2; AOO: 135 km^2; Number of locations: 5.

Justification – The extent of occurrence (EOO) and area of occupancy (AOO) both comply with the criteria for the Endangered category under sub-criteria B1 and B2. This species is represented in herbaria by 21 specimens collected between 1966 and 1993 which suggests that it is relatively abundant. Two out of the 15 known collecting sites occur within the Kibira National Park, while two others are situated in close proximity of the park. All other sites are facing ongoing habitat loss. Plantations of exotic timber species, grazing pressure, domestic livestock trampling, and agriculture are the major threats to the populations. As a result, by considering further expanding of agriculture, the species occurs at 5 locations in which this threat could rapidly and severely affect all individuals present. Based on the





◄ ***Bidens burundiensis*** – Habit (A), lower portion of plant with rootstock (B), flower head (C), basal leaf (D), cauline leaf (E), outer involucral bract (F), inner involucral bract (G), disc floret (H), achenes (I). Drawing by Mesfin Tadesse ©, reproduced with permission from Mesfin Tadesse (1983).

above observations, the habitat quality is thought to decline, and the species is assessed as Endangered (EN).

Bibliography – Lisowski (1991), Ntore & *al.* (2017a18), Tadesse (1983).

Bidens ruyigiensis T.G.J.Rayner

Red List category **Critically Endangered (Possibly Extinct) (CR (PE)).**

IUCN criteria –B2ab(iii).

Description – An annual herb of 26–55 cm tall. Similar to *Bidens burundiensis* but capitula only 1.5–3.9 cm in diameter (3.2–4.9 cm in *B. burundiensis*) and ligular ray florets 2.8–5.2 mm wide (6.2–12.1 mm wide in *B. burundiensis*) with regular apex, tubular disc florets with corolla 1.3–2 × 0.7–0.9 mm (2.9–5.6 × 1.2–1.9 mm in *B. burundiensis*).

Habitat – It occurs in rocky upland grassland, at 2000 m altitude, where it is associated with *Exotheca*.

Seed dispersal – Limited, by means of virtually smooth nutlets without pappus or bristles (autochory).

Distribution – Presently known only from south-eastern Burundi.

Red List parameters – EOO: not applicable; AOO: 9 km^2; Number of locations: 1.

JUSTIFICATION – With a single collecting site the extent of occurrence (EOO) cannot be calculated. The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. The fact that this species has been collected only twice between 1972 and 1976, on almost the same locality, in this generally well-collected region indicates that it is probably rare. The collecting localities are situated outside of protected areas, where the human population is expanding. This results in a combination of degradation and loss of habitat, especially by conversion of grassland into agricultural land, alien timber species plantations and overgrazing and repeated trampling by livestock. This pressure upon habitat leads us to assume the presence of a serious risk of extinction of the species, which could actually well already be extinct, of which its occurrence should be considered as one single location. Based on the above observations, the species is best listed as Critically Endangered (CR), with the tag of Possibly Extinct (PE). The last hope for this species' survival lies in searching the scarce remaining remnants of potentially suitable habitat which occur on summits of some higher mountains.

BIBLIOGRAPHY – Ntore & *al.* (2017a19), Rayner (1993).

◄ ***Bidens ruyigiensis*** Scan of the holotype specimen (Reekmans 5304) at BR

Bothriocline quercifolia C.Jeffrey

Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(ii,iii,iv,v).

Description – An annual herb of 20–70 cm tall; stem slightly woody at the base; leaves incised, deeply and irregularly serrate-crenate, lower ones opposite, upper ones alternate; involucre with 3–4-seriate bracts, pubescent at apex; flowers mauve-violet; achenes 5-costate; pappus with long hairs.

► ***Bothriocline quercifolia*** – Scan of a herbarium specimen (Reekmans 6259) at BR.

Habitat – It grows in savannah and *Eucalyptus* plantations, between 1250 and 1700 m altitude.

Seed dispersal – Mediocre, by nutlets clinging to mammal fur (epizoochory).

Distribution – Known from central Burundi, south-eastern Rwanda and north-western Tanzania.

Red List parameters – EOO: 7,128 km^2; AOO: 54 km^2; Number of locations: 5.

Justification – The extent of occurrence (EOO) complies with the Vulnerable category under sub-criterion B1. Its area of occupancy (AOO) falls within the limits for the Endangered status under sub-criterion B2. It is only known from six herbarium specimens collected between 1936 and 1977, which indicates the species is rare. The comparatively large distances between these sites indicate its population is severely fragmented. All six collecting sites are outside of protected areas, and the species is under inferred severe threat from high human population growth and resulting high pressure upon the natural environment. Conversion of

its suitable habitat to agricultural and pastoral land in Burundi and Rwanda appears to be the greatest threat to the species. As a result of these adverse environmental pressures, the species is undergoing a rapid decline in extent and quality of habitat, as well as in number of mature individuals. However, since one of the six collecting localities is reported to occur in a *Eucalyptus* plantation, it can apparently survive in less natural habitat as well and hence, its rate of decline may be less rapid than thought. Even so, we deem it reasonable to infer a distinct decline of habitat, locations and mature individuals as well as in AOO. By considering the agricultural extension, 5 locations can be defined throughout its geographical range. Based on the above observations, the species is listed as Endangered (EN).

Bibliography – Jeffrey (1988), Lisowski (1992), Ntore & *al.* (2015a20).

Crepis urundica Babc.

IUCN Red List – **Data Deficient (DD).**

Description – A little-branched, perennial herb of up to 80 cm tall; basal leaves rosulate; inflorescence with few capitula, each with ca 40 flowers; corolla pate yellow.

Habitat – It is thought to occur in grasslands and fallows, between 1850 and 2300 m altitude.

◄ ***Crepis urundica*** – Plant (A), flower head (B), detail of receptacle (C), floret lacking ovary (D), detail of ligule teeth (D'), anther tube (E), detail of appendages (F), akenes (G–I), pappus seta (J). Drawing by Harvey Monroe Hall and reproduced with permission from Babcock (1947).

Seed dispersal – Medium, the pappus favours wind dispersal (anemochory), or the nutlets may cling to animal fur (epizoochory).

Distribution – Endemic to the Congo-Nile Divide, occurring in the south-central part of Burundi.

Red List parameters – EOO: 192 km^2; AOO: 27 km^2; Number of locations: 3.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits for the Endangered category under sub-criteria B1 and B2. Based on the fact that the species is known from only three herbarium specimens – the most recent one collected in 1971 – it appears to be rare. This species is restricted to three collecting sites. Unfortunately, all occur in unprotected heavily inhabited areas, and the species is presumed to be in decline due to a strong human pressure on the natural habitat, such as overgrazing by livestock. However, as it is reported that it grows in fallows, it is assumed it can survive agricultural activities and other disturbances, and hence, in combination with its moderately effective seed dispersal, there is no evidence that it is in ongoing decline. Lack of data on the habitat and recent locality information have lead the IUCN SSC Eastern African Plant Red List Authority (2013b) to assess the species as Data Deficient (DD). We here confirm this conclusion.

Bibliography – Babcock (1937, 1947), IUCN SSC Eastern African Plant Red List Authority (2013b), Lawalree & *al.* (1986), Ntore & *al.* (2017d1).

Dewildemania burundiensis Lisowski

Red List category – **Critically Endangered (CR)**.

IUCN criteria – B2ab(iii).

Description – An annual glabrous herb; lower leaves opposite, upper ones alternate; receptacle paleaceous; ligular and tubular flowers yellow; pappus 2-seriate, with scales and bristles.

Habitat – It grows on rocky divides, at 1900–2000 m altitude.

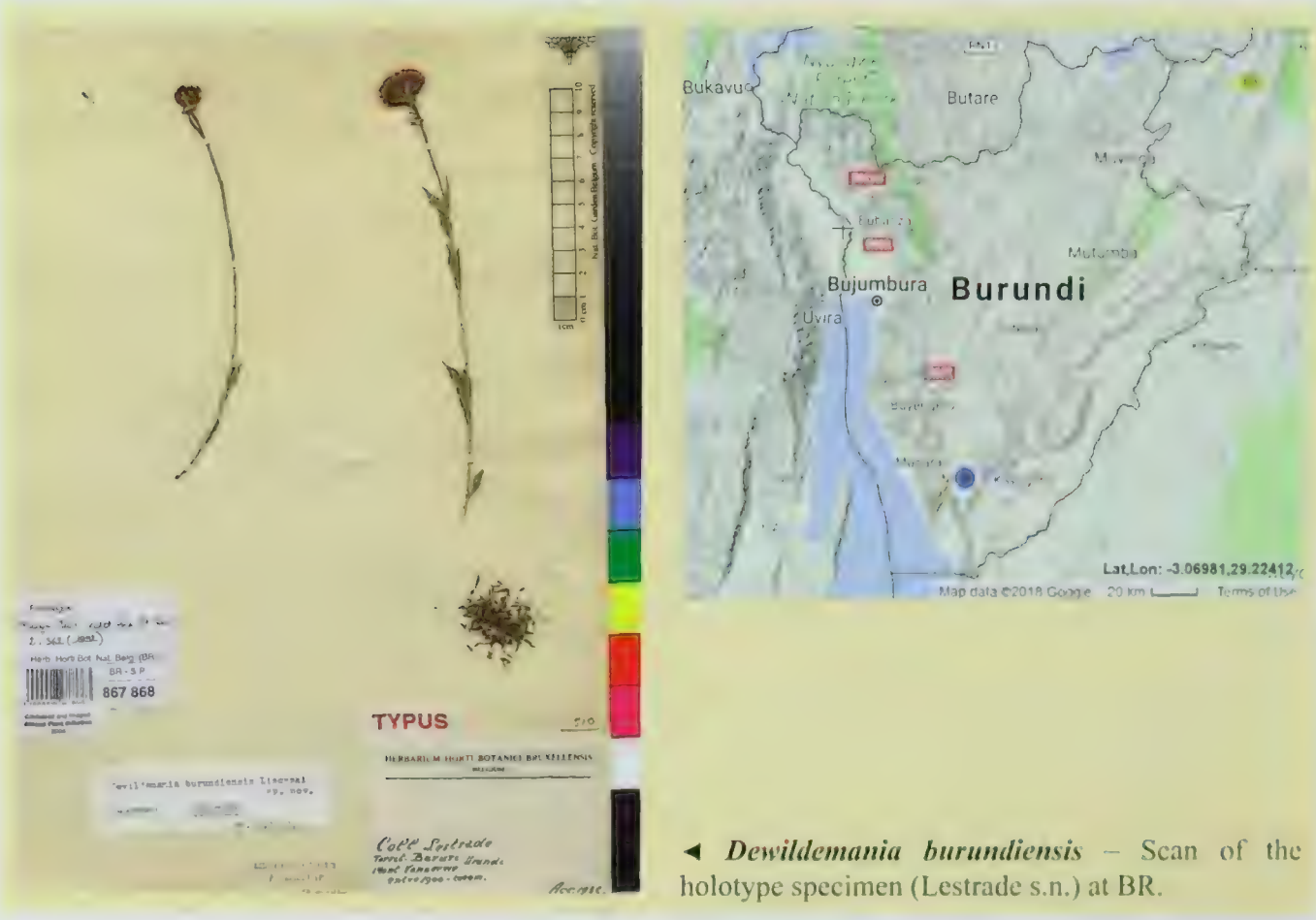
Seed dispersal – Medium, nutlets with pappus of scales and bristles, thus probably by animals (epizoochory) and possibly also by wind (anemochory).

Distribution – Restricted to a single locality on Mount Inanzerwe in southern Burundi.

Red List parameters – EOO: not applicable; AOO: 9 km^2; Number of locations: 1.

Justification – With only one collecting site, the extent of occurrence (EOO) cannot be calculated. The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. This species is known from a single ancient herbarium specimen (no date, but collected before 1936) and is poorly known and assumed to be very rare. Unfortunately, it was found in an unprotected rocky high mountain surrounded by zones inhabited by livestock breeders. Despite the fact that it is unsuitable to cultivation, the mountain is delivered to the teeth and the hoofs of herds of livestock. There is some evidence of large scale pastoral activities encroaching the habitat which could easily render the species Critically Endangered or even Extinct in an unpredictable short time period. Therefore, it seems best to list it as Critically Endangered (CR).

Bibliography – Lisowski (1992), Ntore & *al.* 2017a21).



◄ ***Dewildemania burundiensis*** – Scan of the holotype specimen (Lestrade s.n.) at BR.

Emilia libeniana Lisowski

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B2ab(ii,iii).

DESCRIPTION – A perennial, rhizomatous herb, of 12–30 cm tall; stem very short, densely and long villous, densely foliated; flowers all hermaphroditic, pale yellow, tubular, achenes pubescent.

HABITAT – It occurs in swamps at lower altitude.

SEED DISPERSAL – Medium, probably by wind (anemochory) or clinging to animal fur (epizoochory).

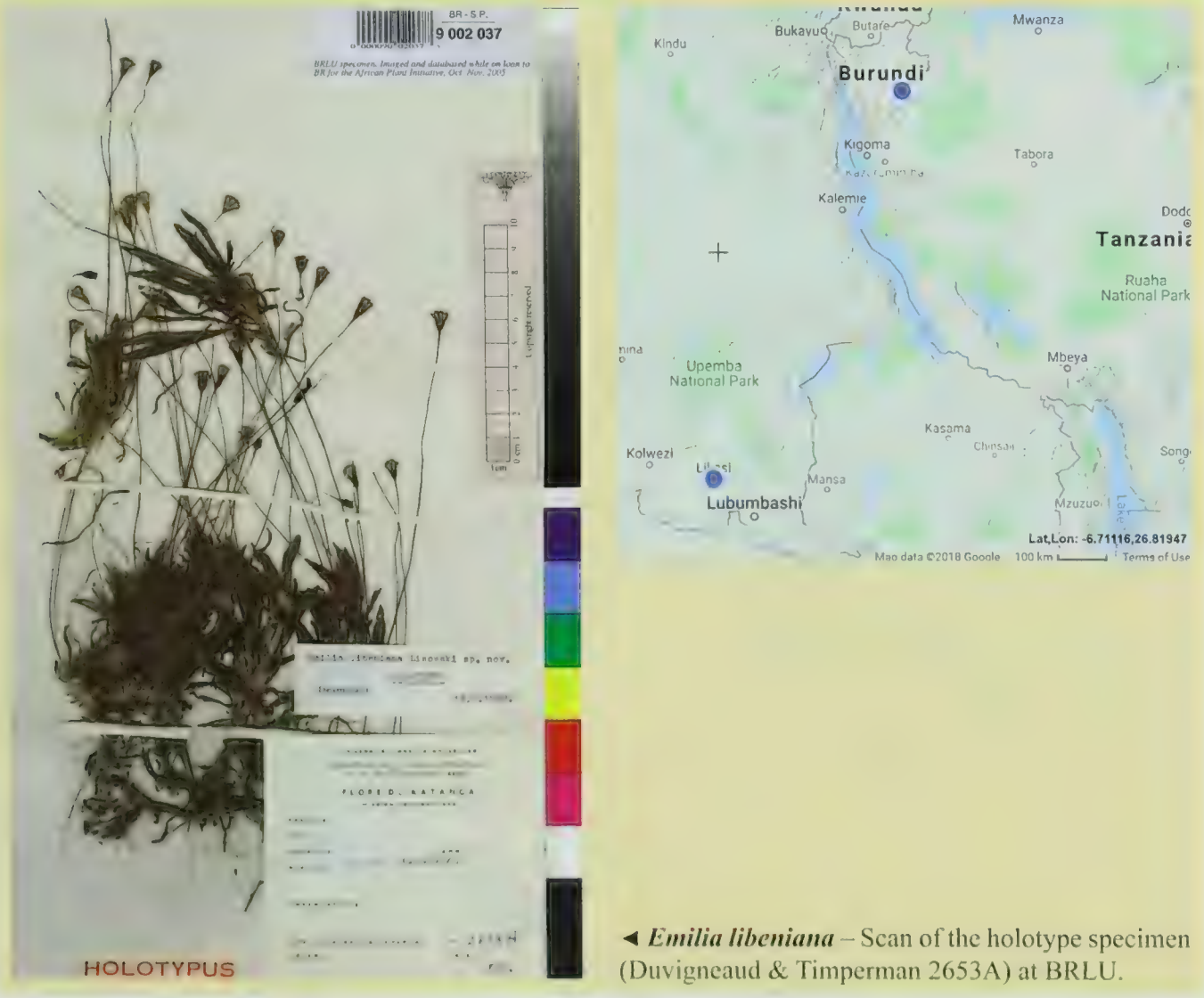
DISTRIBUTION – Known from only two disjunct sites, one in south-eastern Burundi, the other one in south-eastern Democratic Republic of the Congo.

RED LIST PARAMETERS – EOO: not applicable; AOO: 18 km²; Number of locations: 2

JUSTIFICATION – With only two collecting sites an extent of occurrence (EOO) cannot be calculated. The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. The fact that the species has been collected only twice – most recently in 1956 – indicates that the species is rare. The two collecting sites are separated from each other by ca 1000 km. Unfortunately, both subpopulations are located outside protected areas, and are thus under threat of habitat loss. In Burundi, this is due to the human, mainly agricultural, activities in the area, while in the Democratic Republic of the Congo mining activities threaten the surroundings of Likasi where the species occurs. The inferred

ongoing loss of its habitat leads to an inferred continuing decline in AOO. In addition, the species' population is severely fragmented and confronted to genetic erosion related to the strong isolation of the two subpopulations. By considering the habitat loss, the species occurs at 2 locations. Based on the above observations, it is listed as Endangered (EN).

Bibliography – Lisowski (1991), Ntore & *al.* (2017a22).



◄ ***Emilia libeniana*** – Scan of the holotype specimen (Duvigneaud & Timperman 2653A) at BRLU.

Emilia subscaposa Lisowski

Red List category –**Endangered (EN)**.

IUCN criteria – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

Description – An annual herb, 15–35 cm tall; leaves in basal rosette; involucral bracts pubescent; flowers all hermaphroditic, tubular, orange; stylar branches ending in an subulate appendix.

Habitat – It grows generally in swamps, but has also been reported from sandy fallows, cassava fields and dry grassland, at 775–1030 m altitude.

Seed dispersal – Medium, probably by wind (anemochory) or clinging to animal fur (epizoochory).

◄ ***Emilia subscaposa*** – Scan of the holotype specimen (Lewalle 938) at BR.

DISTRIBUTION – Known from the Rusizi Plain in western Burundi and eastern Democratic Republic of the Congo.

RED LIST PARAMETERS – EOO: 706 km^2; AOO: 45 km^2; Number of locations: 3.

JUSTIFICATION – The extent of occurrence (EOO) and area of occupancy (AOO) both fall within the limits for the Endangered category under sub-criteria B1 and B2. This species is known only from six herbarium specimens collected between 1950 and 1971. Unfortunately, all the collecting localities occur outside protected areas in a densely populated zone. Habitat loss due to grassland conversion, mainly for pastoral activities, but also urban development, is the main threat to the survival of this species. These ongoing adverse environmental pressures on the land lead us to infer a continuing decline in EOO and AOO, in the extent and quality of the habitat, as well as in population size. But, since it is reported that it is found in fallows and cassava fields, the species seems to be quite adaptable to disturbance due to human activities, and its decline is uncertain. However, it is found only in a restricted, non-protected area at 3 small locations. Therefore, the species is best placed in the Endangered category (EN).

BIBLIOGRAPHY – Lisowski (1991), Ntore & *al.* (2017a23)

Ethulia burundiensis M.G.Gilbert & C.Jeffrey

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B1ab(ii,iii,iv)+2ab(ii,iii,iv).

DESCRIPTION – An aromatic herb of up to 1.0(–1.5) m tall; stems erect, branched, with spreading crisped-pilose hairs; inflorescence corymbose; florets 20–25(–30); corolla 2.5–3.2 mm long, mauve, violet or blue; nutlets broadly obconical, 4–6-ribbed.

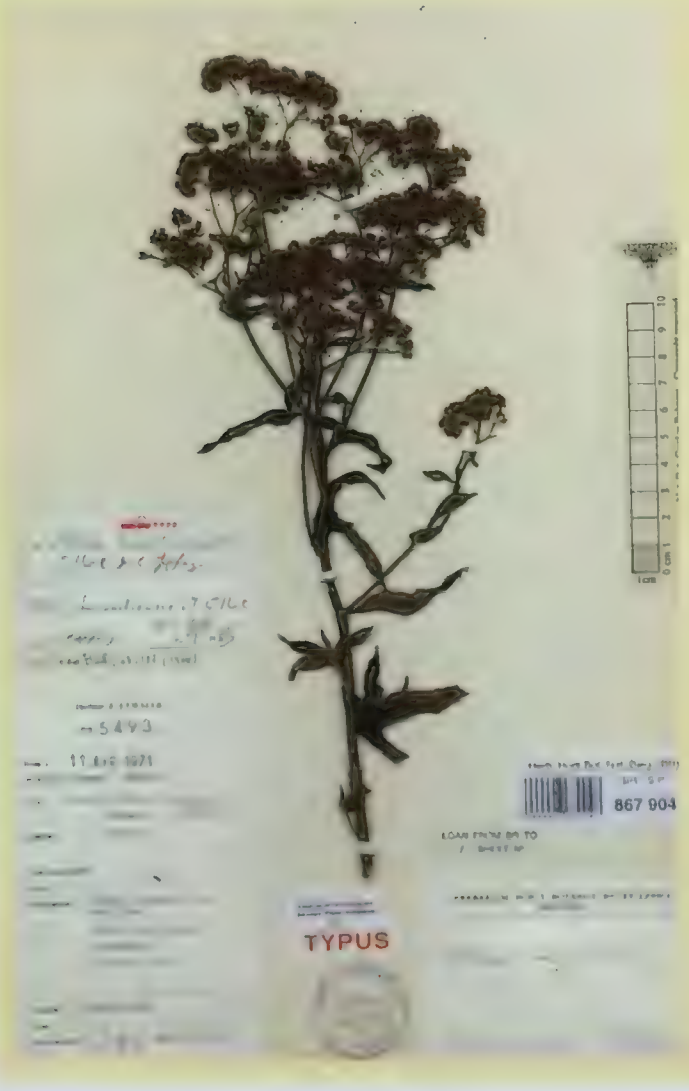
HABITAT – It grows in marshes with *Phragmites* or peat bogs with *Sphagnum*, between 1450 and 2200 m altitude.

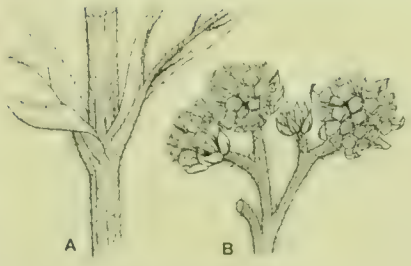
SEED DISPERSAL – Limited, by means of ribbed nutlets without pappus (autochory).

DISTRIBUTION – Known from western and central Burundi, northern and southern Rwanda and south-eastern Democratic Republic of the Congo.

RED LIST PARAMETERS – EOO: 4,843 km^2; AOO: 117 km^2; Number of locations: 5.

JUSTIFICATION The extent of occurrence (EOO) and area of occupancy (AOO) both meet the thresholds for the Endangered category under sub-criteria B1 and B2. Recorded 17 times between 1935 and 1979, this species is thought to be uncommon but not rare. Unfortunately, only one of the collecting sites lies within a protected area (the Kibira National Park in Burundi); the others are from densely populated areas where the suitable habitat has been





◄▲ ***Ethulia burundiensis*** – Scan of the isotype specimen (Lewalle 5493) at BR; stem and base of leaf pair (A), fruiting heads (B). Drawing by Christopher Grey-Wilson (©), reproduced with permission from Gilbert & Jeffrey (1988).

degraded, or even lost, due to human pressure. The conversion of marshes to agricultural land and the industrial extraction of peat in several localities allow to infer a continuous decline in population size of the species, in AOO and also in extent and quality of its habitat. By considering agriculture activities, the species occurs at 5 distinct locations. Based on the observations listed above, it is listed as Endangered (EN).

BIBLIOGRAPHY – Gilbert & Jeffrey (1988), Lisowski (1992), Ntore & *al.* (2017a24).

Grangea jeffreyana Fayed

IUCN RED LIST – **Data Deficient (DD)**.

DESCRIPTION – A small annual, erect herb, 10–15 cm tall, with a branched stem; leaves entire; flowers yellow, tubular, peripheral ones carpellate, central ones hermaphroditic.

HABITAT – It is growing in swamps, at 1400 m altitude.

SEED DISPERSAL – Limited, possibly the glandular but otherwise smooth nutlets with only very short pappus cling to animal fur (epizoochory).

DISTRIBUTION – Only known from the Ruvubu swamp in Kinazi, eastern Burundi.

RED LIST PARAMETERS – EOO: not applicable; AOO: 9 km²; Number of locations: 1.

◄ ***Grangea jeffreyana*** – Scan of the isotype specimen (Reekmans 3760) at BR.

Justification – With only one collecting site the extent of occurrence (EOO) cannot be calculated. The area of occupancy (AOO) falls within the limits for the Critically Endangered status under sub-criterion B2. This species is known from a single specimen collected in 1974 and is thought to be very rare. However, since its single location lies inside a protected area (Ruvubu National Park), any specific threat of habitat loss and therefore any severe continuing decline cannot be presumed. On the other hand, the species is little-known and more data like abundance and/or distribution are necessary to allow us to list it into any category. Based on the above information, the species is best assessed as Data Deficient (DD). A thorough search is still required to confirm its survival.

Bibliography – Fayed (1979), Lisowski (1991), Ntore & *al.* (2017a25).

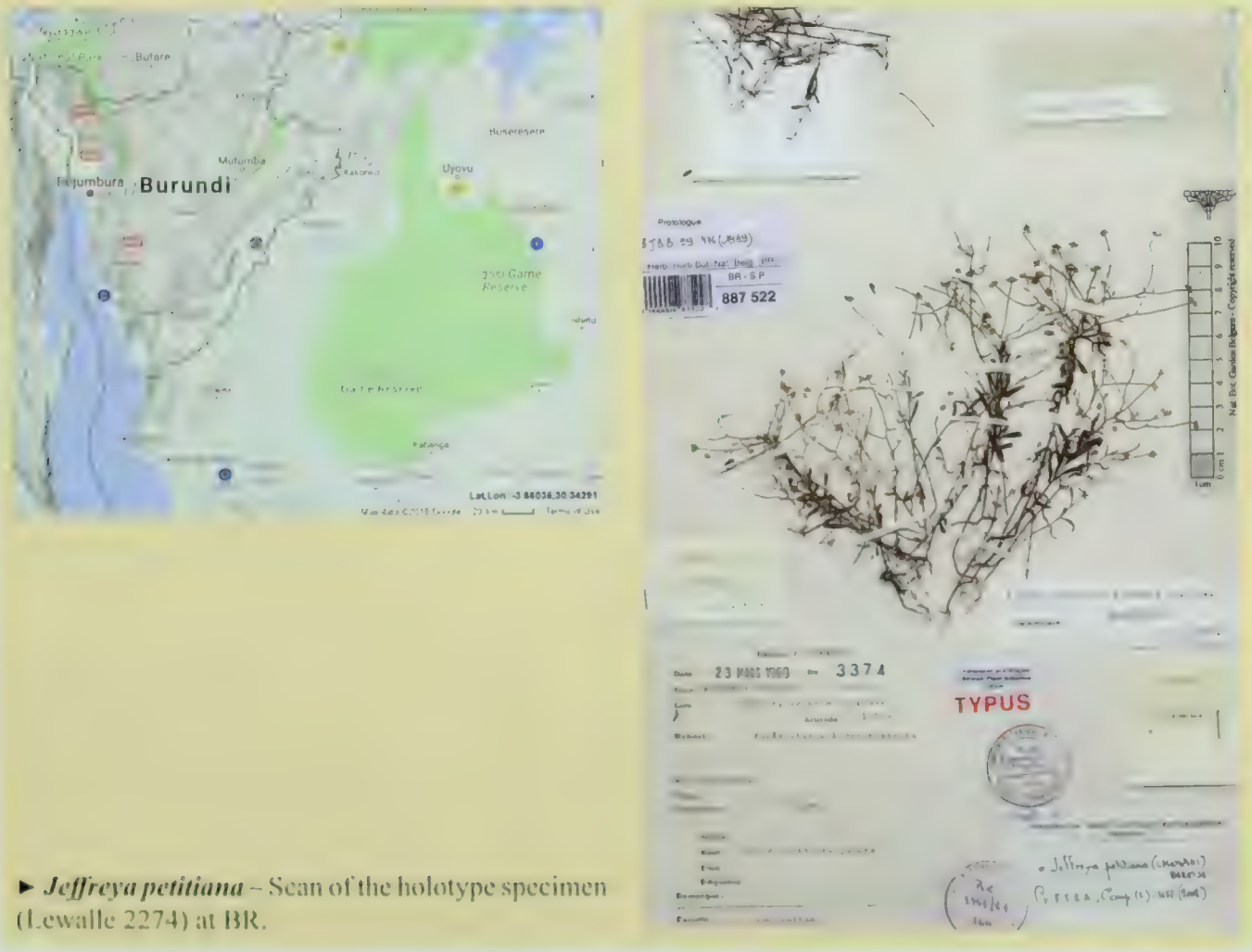
Jeffreya petitiana (Lisowski) Beentje

Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(i,ii,iii,iv,v).

Synonyms – *Felicia petitiana* Lisowski.

Description – An annual herb, 5–30 cm tall; capitula 2–3 mm wide; peripheral flowers ligular, 8–9 per capitulum, carpellate, yellow, central flowers hermaphroditic, tubular; achenes obovate, setulose; pappus absent.



► ***Jeffreya petitiana*** – Scan of the holotype specimen (Lewalle 2274) at BR.

Habitat – It occurs in *Brachystegia* woodland and forest edges, at ca 1050 m altitude.

Seed dispersal – Medium, probably by wind (anemochory) or clinging to animal fur (epizoochory).

Distribution – Known from Rumonge and Mosso respectively in south-western and eastern Burundi, and from the Kahama and the Kigoma districts in western Tanzania.

Red List parameters – EOO: 21,411 km^2; AOO: 36 km^2; Number of locations: 4.

Justification – The extent of occurrence (EOO) exceeds the limits for the Vulnerable status under sub-criterion B1, but the area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species has been collected only four times between 1926 and 1969, and is thought to be rare. Unfortunately, all known collecting sites occur outside protected areas, where large tracts of woodland are cleared. Only one of them is in the proximity of Kigosi Game Reserve in Tanzania wherein the species is likely to be present. All localities are under severe threat of habitat loss and degradation mostly due to the expansion of agricultural land, as well as overgrazing and urban expansion. These threats are causing an ongoing decline both in the quality and the extent of habitat, in the number of locations and mature individuals and thus, also in EOO and AOO. By considering expansion of agricultural land, the species occurs at 4 locations. Based on the above observations, it is listed as Endangered (EN).

Bibliography – Beentje (2002), Lisowski(1989 & 1991), Ntore & *al.* (2017a26).

Nidorella burundiensis Lisowski

Red List category – **Critically Endangered (Possibly Extinct) (CR (PE))**.

IUCN criteria – B2ab(iii,v).

Botany – An erect herb, up to 40–65 cm tall; inflorescence with terminal corymbs; capitula heterogamous, subglobose; flowers yellow, peripheral ones ligular, carpellate, ligule bilobed at apex, central flowers tubular, hermaphroditic.

Habitat – It grows on eroded hills, on rocky soil, in vegetation dominated by *Eragrostis* sp., at ca 1800 m altitude.

Seed dispersal – Fairly good, by means of nutlets crowned with pappus blown by the wind (anemochory).

Distribution – Known from only a single locality in Karuzi in central Burundi.

Red List parameters – EOO: not applicable; AOO: 9 km^2; Number of locations: 1.

Justification – With only one collecting site the extent of occurrence (EOO) cannot be calculated. The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. This species is only known from the type specimen collected in 1949, and should thus be considered as very rare. The fact that it has not been recollected in this well collected zone (especially by Van den Ben) doesn't bode well for the survival of the species. It is known from one locality, which is not protected in any way, but is the scene of conversion of natural habitat for livestock pasture and timber plantations. All these adverse environmental pressures on the land have already destroyed the grassy areas and led to intense

◄ ***Nidorella burundiensis*** – Scan of the holotype specimen (Taton 994) at BR.

habitat loss. Those threats will have resulted in a very high continuous decline in extent and quality of habitat, as well as in mature individuals of the species. In fact, it might well have undergone severe decrease and may even have gone extinct. Based on the above observations, the species is listed as Critically Endangered (CR), with the tag Possibly Extinct (PE). A targeted survey is needed to confirm the suspicion that it is already extinct in the wild.

Bibliography – Lisowski (1991), Ntore & *al.* (2017f4).

Senecio lewallei Lisowski

Red List category – **Critically Endangered (Possibly Extinct) (CR (PE))**.

IUCN criteria – B1ab(iii,v)+B2ab(iii,v).

Description – A perennial, rhizomatous, erect herb, 0.6–1.2 m tall; peduncle with glandular hairs; involucral bracts 13, calyculus with 6–7 bracts; flowers yellow, 7–8 peripheral ones ligular, carpellate, central ones tubular, hermaphroditic; achenes with long pappus.

Habitat – It occurs in upland swamps, at 2000–2100 m altitude.

Seed dispersal – Good, by means of nutlets (achenes) crowned with pappus blown by the wind (anemochory).

DISTRIBUTION – Endemic to the Congo-Nile Divide, occurring in western Burundi.

RED LIST PARAMETERS EOO: 0.143 km²; AOO: 0.080 km²; Number of locations: 1.

JUSTIFICATION The extent of occurrence (EOO) and the area of occupancy (AOO) fall within the Critically Endangered category under sub-criteria B1 and B2. This species is currently known from only three herbarium records, collected more than 45 years ago, and is thought to be rare. Unfortunately, all collecting sites lie outside protected areas, where multiple threats have led to the destruction of probably most, if not all, of its habitat. The swampy wetlands where it grew have been drained to allow industrial peat extraction and conversion to agricultural fields. This will have caused a continuous decline in the population size of this species and leads us to predict a continuous decline in the number of mature individuals. In addition, due its very restricted high elevational range (2000–2100 m), the species is potentially exposed to major impacts of global warming predicted for the next decades, which could severely affect its grassland high-elevation habitat. By considering the drainage of the marshes, it distribution range is composed of a single location. Based on the above observations, the species is assessed as being Critically Endangered (CR), with the tag Possibly Extinct (PE).

NOTE By using a cell width of 3 km, AOO is 18 km² which is bigger than EOO (0.143 km²) which is not possible. Then, to get an AOO smaller than the EOO, it becomes necessary to reduce the cell width to 0.2 km.

BIBLIOGRAPHY – Lisowski (1991), Ntore & *al.* (2017a27).

◄ ***Senecio lewallei*** – Scan of the holotype specimen (Lewalle 2674) at BR.

Vernonia agrianthoides C.Jeffrey

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – EN B2ab(iii).

SYNONYMS – *Oocephala agrianthoides* (C.Jeffrey) H.Rob.

DESCRIPTION – A geofrutex (woody part below soil level) of up to 50–60 cm; capitula sessile, grouped in terminal compact glomerules surrounded by the upper leaves.

► ***Vernonia agrianthoides*** – Scan of a herbarium specimen (Reekmans 5936) at BR.

HABITAT – It grows in grassy savannah and rocky areas, at 1050–1550 m altitude.

SEED DISPERSAL – Efficient, nutlets crowned with pappus are blown by the wind (anemochory).

DISTRIBUTION – Found in north-eastern, eastern and south-eastern Burundi, as well as in western Tanzania.

RED LIST PARAMETERS – EOO: 9,460 km^2; AOO: 81 km^2; Number of locations: 5.

JUSTIFICATION – The extent of occurrence (EOO) meets the thresholds for the Vulnerable status under sub-criterion B1, while the area of occupancy (AOO) falls within the Endangered category under sub-criterion B2. This species is known from 12 herbarium specimens collected between 1926 and 1977, and should be considered as fairly rare. All collecting sites are from outside protected areas, and are under great threat of grassy habitat loss which creates the biggest source of pressure on the species. The main factors causing habitat loss are agriculture (cotton plantation), planting of exotic tree species, as well as overgrazing

aggravated by a repetitive trampling of vegetation by cattle. These threats lead us to infer a continuing decline in quality and extent of suitable habitat. By considering the above, 5 locations can be defined. This information leads to the assessment of the species in the Endangered (EN) category.

BIBLIOGRAPHY – Jeffrey (1988, 2000), Kalanda & Lisowski (1995), Ntore & *al.* (2017a28), Robinson (1999).

Balsaminaceae

Impatiens bururiensis Grey-Wilson

RED LIST CATEGORY – **Endangered (EN).**

IUCN CRITERIA – B1ab(iii,v)+2ab(iii,v).

DESCRIPTION – A perennial herb up to 1–1.2 m tall, with a thin creeping rhizomatous rootstock; flowers with deep red narrowly horn-shaped lower sepal and spur, and laterally united petals; lateral sepals and dorsal petal greenish.

▼ *Impatiens bururiensis* – Photo by Eberhard Fischer (©) taken in the Siguvyaye Valley, Burundi.

HABITAT – It occurs in upland, along stream banks, at an altitude of 1500–1900 m

SEED DISPERSAL – Limited, ballistic (ballochory) by explosive dehiscence of capsules

DISTRIBUTION – Only known from a single region on the Congo-Nile Divide in south-western Burundi.

RED LIST PARAMETERS – EOO: 15 km²; AOO: 36 km²; Number of locations: 2

JUSTIFICATION – The extent of occurrence (EOO) falls within the limits for the Critically Endangered status under sub-criterion B1, while its area of occupancy (AOO) falls within

the limits for the Endangered status under sub-criterion B2. The species is known from seven herbarium specimens collected between 1958 and 2014, showing it is rare. Two out of the four collecting sites are at the edge of a small protected area (the Bururi Forest Nature Reserve), more degraded by the disturbance from encroachment than the inside. The disturbance comes especially from clearing of road edges and surroundings of a water catchment station where the species grows. In the other two sites outside the reserve, its fragile stream bank habitat is severely and rapidly altered by overgrazing and trampling by cattle when it has not been deliberately denuded. This pressure upon the natural habitat leads us to infer a continuous decline in the number of mature individuals and to define 2 locations for the species. Based on the above information, the species is rated as Endangered (EN). The species is presently cultivated in the Botanic Garden Meise, Belgium and in the Botanic Gardens of Bonn, Germany.

Bibliography – Grey-Wilson (1979), Ntore & *al.* (2017f5).

Impatiens gesneroidea Gilg

Red list category – **Vulnerable (VU).**

IUCN criteria – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

Description – A herb or a suffrutex, erect, up to 2 m tall; stems, pubescent to tomentose, flowers with deep red lateral united petals showing a yellow center, dorsal petal greenish, red at base; lower sepal horn-shaped with curved green spur, densely pubescent.

▲ ***Impatiens gesneroidea*** – Photo by Eberhard Fischer (©) taken at Mount Bigugu, Rwanda.

Habitat – The species occurs in moist, often densely shaded areas, in upland rain forest, occasionally in bamboo thickets or along river margins, at 2000–3300 m altitude.

Seed dispersal – Limited, ballistic (ballochory) by explosive dehiscence of capsules.

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, western Rwanda, and eastern Democratic Republic of the Congo.

Red List parameters – EOO: 17,333 km²; AOO: 198 km²; Number of locations: 8.

JUSTIFICATION – The extent of occurrence (EOO) falls within the limits for the Vulnerable status under sub-criterion B1, while its area of occupancy (AOO) complies with the criteria for the Endangered status under sub-criterion B2. In herbaria, the species is represented by 50 specimens collected between 1929 and 1999 and should be considered as moderately common. Most collecting sites lie within protected areas (the Kibira National Park in Burundi, the Nyungwe National Park in Rwanda, and the Kahuzi-Biega National Park in Democratic Republic of the Congo). The remaining ones lie outside protected areas, in forests which are doomed to the machete used for conversion to agriculture and firewood harvesting. This ongoing pressure leads us to infer a continuous decline in the number of mature individuals, in extent/quality of habitat, in number of subpopulations, and in AOO and EOO. By considering the threats, 8 locations in which all individuals present can be seriously and rapidly affected could be identified. Hence, based on the above informations, the species is assessed as Vulnerable (VU).

BIBLIOGRAPHY – Fischer & Killmann (2008).

Impatiens keilii Gilg

RED LIST CATEGORY – **Least concern (Conservation Dependent) (LC (CD))**.

DESCRIPTION – A perennial epiphytic succulent herb; stems ascending to erect, up to 50 cm long; flowers with yellow and deep red lower sepal and spur spirally twisted at the end; dorsal petal and lateral united petals green.

HABITAT – This epiphytic species occurs in rain-forest, usually on tree trunks, or sometimes on fallen rotten trees or stumps, occasionally on mossy boulders, at between 1200 and 2400 m altitude.

SEED DISPERSAL – Limited, ballistic (ballochory) by explosive dehiscence of capsules.

DISTRIBUTION – Endemic to the Albertine Rift, only known from the western and eastern Crest of the central African Rift: western Burundi and Rwanda, and eastern Democratic Republic of the Congo.

▲ ***Impatiens keilii*** – Photo by Eberhard Fischer (C) taken at Gisakura, Rwanda.

Red List assessment parameters – EOO: 4,238 km^2; AOO: 150 km^2; Number of locations: not applicable.

Justification – The extent of occurrence (EOO) of *I. keilii* is estimated to be 4,238 km^2 and its area of occupancy (AOO) is about 150 km^2 which both comply with the criteria for the Endangered status under sub-criterion B1 and B2. The species is represented in herbaria by eight specimens collected between 1932 and 1979 and should be considered as rare. It is known from five sites, but Fischer (1993, 1997) and Fischer & Killmann (2008) report its presence at Tshibati, 2200 m, within the Kahuzi-Biega National Park in Democratic Republic of the Congo. Four out of the known collecting sites lie within protected areas (the Kibira National Park in Burundi, the Nyungwe National Park in Rwanda). The other ones lie outside of a protected area. It is believed to be gone from Mount Mubone where the type specimen was collected by Keil in the beginning of the 20th century, since the locality has been deforested and planted by alien timber species that significantly altered the native habitat upon which the species depends. However, due to the fact that it occurs mostly in protected areas, there is no evidence that it is declining through its range, seriously or fast enough to meet (or to be close to meeting) any of the thresholds necessary to be listed as threatened. Thus, it does not meet the conditions required (at least 2 out of the 3) for the sub-criterion B2, and thus cannot be assessed into any threat category. Hence, based on the above observations, the species is listed as Least Concern. But, since the species mainly occurs in protected areas, it is appropriate to add the designation of 'Conservation Dependent'. The species is cultivated at the Botanic Gardens of Bonn University, Germany, at Meise Botanic Garden, Belgium, and at the Royal Botanic Gardens, Kew.

Note – Some taxonomists have recognized two subspecies within *I. keilii*: subsp. *pubescens* Grey-Wilson from Tanzania and subsp. *keilii* from Burundi, Rwanda and the Democratic Republic of the Congo. We here follow the most recent opinion of Fischer & Killmann (2008) who recognize both taxa as distinct species.

Bibliography – Fischer (1993, 1997), Fischer & Killmann (2008), Gilg (1909).

Begoniaceae

Begonia pulcherrima Sosef

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(iii,v)+2ab(iii,v).

Description – A herb to 25(–35) cm tall, with stout, elongated rhizome; leaves peltate, with sparsely hirsute petiole of up to 27 cm, blade ± symmetrical, ovate to broadly elliptic, (4–)6–14 × (2.5–)4–10 cm, with a remotely dentate margin; male and female flowers with 2 bright yellow ± circular petals of 11–27 mm wide; stamens (13–)20–31, in an asymmetrical bundle; inferior ovary ellipsoid to narrowly ellipsoid-ovoid, glabrous.

Habitat – It occurs in montane forest, in shade, with *Syzygium*, *Pentadesma*, *Carapa*, also on slopes, along streamlets, on wet soils, between 1650 and 2000 m altitude.

Seed dispersal – Limited, possibly seed fall in mud which is carried away on legs of passing animals (epizoochory).

Distribution – Endemic to the Congo-Nile Divide, occurring in north-western Burundi and in south-western Rwanda.

Red List parameters – EOO: 780 km^2; AOO: 72 km^2; Number of locations: 4.

◄ ***Begonia pulcherrima*** – Photo by Eberhard Fischer (©) taken at the Kamiranzovu Swamp, Rwanda.

Justification – The extent of occurrence (EOO) and area of occupancy (AOO) both meet the threshold values of the Endangered category under sub-criterion B1 and B2, respectively. This species was recorded 13 times between 1951 and 1999 and might be considered as fairly rare. Four out of the 13 collections are from within a protected area (the Nyungwe National Park in Rwanda) where it is safe; all of the other collecting sites are situated in zones adversely impacted by human disturbances driven by gold mining in the Ruhwa Valley in Burundi, and agricultural activities in Burundi and in Rwanda. The ongoing loss/degradation of habitat leads us to infer a continuing decline in the number of mature individuals. The habitat loss leads us also to define 4 locations for the species. Based on the information above, the species is listed as Endangered (EN). It is cultivated at the Botanic Gardens of Bonn University, Germany.

Bibliography – Fischer & Killman (2008), Ntore & *al.* (2017a29), Sosef (1992)

Campanulaceae

Wahlenbergia petraea Thulin

Red List category – **Endangered (EN).**

IUCN criteria – B2ab(iii,v).

Description – A perennial erect herb reaching 30 cm tall, with a taproot; generally with numerous stems, erect or often prostrate at the base and ascendant, little branched; leaves linear; calyx tube subglabrous; corolla blue, lobes narrow, twice as long as the calyx lobes.

Habitat – It occurs in montane grassland associated with *Exotheca* and *Eragrostis*, at 2000 m altitude.

Seed dispersal – Probably limited, seeds being shed from the dry capsule (autochory).

Distribution – Endemic to southern Burundi.

▲ ***Wahlenbergia petraea*** – Photo by Eberhard Fischer (©) taken at Bururi, Burundi.

Red List parameters – EOO: not applicable; AOO: 18 km^2; Number of locations: 2.

Justification – The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. This species is known only from the type specimen collected in 1977 and a verified observation from grassland on a summit in Bururi Forest Reserve in 2013. Unfortunately, one of the two occurrence sites lies outside a protected area, where the grassland habitat is being degraded and lost through planting of alien tree species, conversion of grassland for agricultural and pastoral uses. This loss of habitat leads us to infer a continuing decline in number of mature individuals. Based on the above observations, the species is assessed as Endangered (EN).

Bibliography – Thulin (1987), Ntore & *al.* (2017a30).

Wahlenbergia pulchella Thulin subsp. *michelii* Thulin

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B2ab(iii,v).

DESCRIPTION – A herb up to 13–40 cm tall; stem hirsute below but glabrous in upper parts; leaves linear-lanceolate; pedicel 3–20 mm long; corolla glabrous outside.

HABITAT – It occurs in high-elevation grassland, between 1600 and 2000 m altitude.

SEED DISPERSAL – Probably limited, seeds being shed from the dry capsule (autochory).

DISTRIBUTION – Known from Burundi, Rwanda and in the east of the Democratic Republic of the Congo.

◄ ***Wahlenbergia pulchella* subsp. *michelii*** – Scan of the holotype specimen (Lewalle 1938) at BR.

RED LIST PARAMETERS – EOO: 15,058 km²; AOO: 63 km²; Number of locations: 4.

JUSTIFICATION – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1 and its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The subspecies is known from 10 herbarium specimens collected between 1926 and 1974 and may be considered as moderately rare. Unfortunately, all collecting sites are from outside protected areas in densely populated zones, where the grassland habitat is being lost and degraded through conversion of land for agricultural use. This degradation loss of habitat has resulted in a continuing decline in habitat quality and number of mature individuals. By considering the expanding agriculture,

the species occurs at 4 locations in which all individuals could be affected by this threat. Based on the above, this subspecies is listed as Endangered (EN).

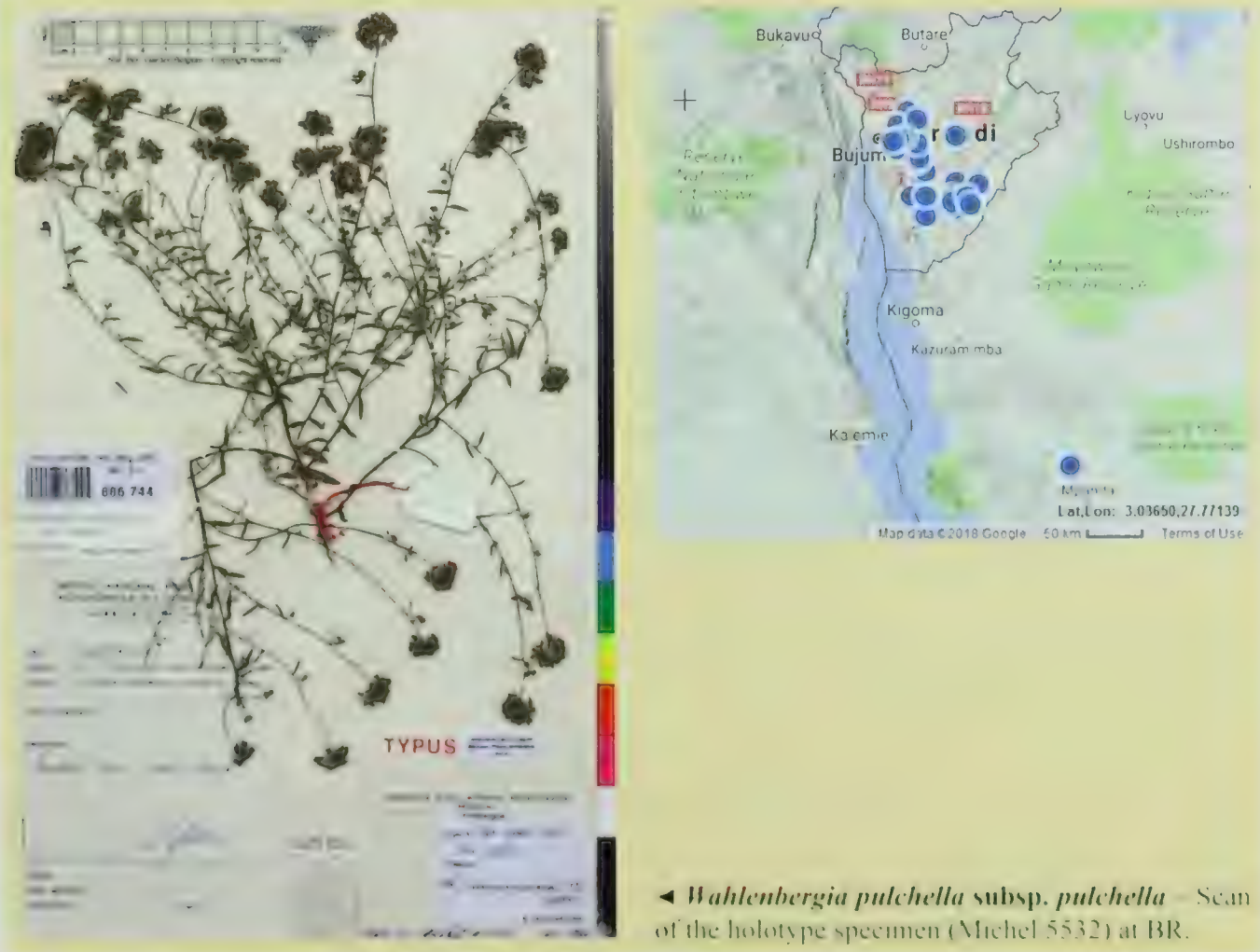
Note – This taxon is one of six subspecies distinguished within *W. pulchella* Thulin, four of which have a relatively small distribution area in tropical Africa. Some of them are fairly widespread (subsp. *laurentii* Thulin occurs in eastern Democratic Republic of the Congo, subsp. *mbalensis* Thulin is found in south-western Tanzania and north eastern Zambia, subsp. *paradoxa* Thulin is known from Tanzania and Zambia, while subsp. *pedicellata* Thulin occurs in Burundi, Rwanda and Tanzania). Here we assess two of them: subsp. *michelii* and subsp. *pulchella*. The species as a whole is assessed as Least Concern (LC) (IUCN SSC Eastern African Plant Red List Authority, 2017).

Bibliography – IUCN SSC Eastern African Plant Red List Authority (2017), Ntore & *al.* (2017f6), Thulin (1975, 1977).

Wahlenbergia pulchella Thulin subsp. *pulchella*

Red List category – **Least Concern (LC)**.

Description – An erect to spreading herb up to 6–30 cm tall; stem hirsute from bottom to top; leaves variable, never linear, up to 7–16 mm long; flowers sessile or with pedicel up to 1 mm long; corolla 4–7 mm long, pilose outside.



◄ ***Wahlenbergia pulchella* subsp. *pulchella*** – Scan of the holotype specimen (Michel 5532) at BR.

HABITAT – It occurs in high elevation montane grassland, often in wet places or among rocks, at (1300–)1800–2400 m in elevation.

SEED DISPERSAL – Probably limited, seeds being shed from the dry capsule (autochory).

DISTRIBUTION – Occurring in western, southern and central Burundi and in western Tanzania.

RED LIST PARAMETERS –EOO: 12,109 km²; AOO: 261 km²; Number of locations: 13.

JUSTIFICATION –The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. This subspecies is known from 36 herbarium specimens collected between 1926 and 1997 and seems to be moderately abundant. Unfortunately, all the collecting localities are outside protected areas except the single site (Tombe) in Tanzania. The rocky grassland habitat is mostly being lost and degraded by conversion of land for pastoral use and planting of foreign tree species resulting in the decline of this subspecies. However, as the subspecies occurs at 13 locations, which exceeds the upper limit to qualify for the Endangered status, it does not meet the condition 'a' referring to the number of locations. With that, the subspecies does not meet the required minimal of two conditions under Criterion B and thus cannot be assessed into a threat category. Based on the above observations, this subspecies is assessed as Least Concern (LC).

BIBLIOGRAPHY – Ntore & *al.* (2017d2), Thulin (1975, 1977).

Capparaceae

Maerua descampsii De Wild.

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

DESCRIPTION – A shrub of up to ± 2 m tall; lower leaves 3-foliolate, upper leaves simple, flowers with 4 sepals and 4 or 6–8 obovate petals; stamens ± 20; gynophore as long as the stamens.

VERNACULAR NAMES – Agaturamugina (in kirundi).

HABITAT – It is thought to be restricted to bushland or riverine forest, on rocky slope, at 780–900 m altitude.

SEEDS DISPERSAL – Good, fruit are eaten and seeds excreted by birds (endozoochory).

DISTRIBUTION – Known from western Burundi and south-eastern Democratic Republic of the Congo.

RED LIST PARAMETERS – EOO: 236 km²; AOO: 36 km²; Number of locations: 2.

JUSTIFICATION – The extent of occurrence (EOO) and its area of occupancy (AOO) both fall within the limits for the Endangered category under sub-criteria B1 and B2. The species is known from 6 herbarium specimens collected between 1895 and 1980 and may be

considered as rare. Unfortunately, all known sites lie outside protected areas in zones that are under adverse human pressure. The site in south-eastern Democratic Republic of the Congo is isolated by a distance of ± 250 km from the other ones in Burundi. Throughout its restricted range in Burundi, its habitat is under great pressure due to the impact of increasing human activities like agricultural and pastoral expansion, and expanding human settlements. The population in the Democratic Republic of the Congo seems to be doomed to go extinct due to rapid urban expansion around the town of Kalemie. Furthermore, its isolation

◄ ***Maerua descampsii*** – Scan of a herbarium specimen (Lewalle 4504) at BR.

suggests that there is no gene flow between it and the Burundian one, and could thus result in genetic decline of the species. The loss degradation of the remaining intact natural habitat leads us to infer a continuing decline in the number of mature individuals, the number of locations, as well as the EOO and the AOO. By considering habitat loss, the species occurs at 2 locations, in which all individuals can be severely affected by this threat. Based on the above observations, it is considered to be facing a high risk of extinction and is assessed as Endangered (EN).

BIBLIOGRAPHY – Hauman & Wilczek (1951), Ntore & *al.* (2017a31).

Vaccinium stanleyi Schweinf.

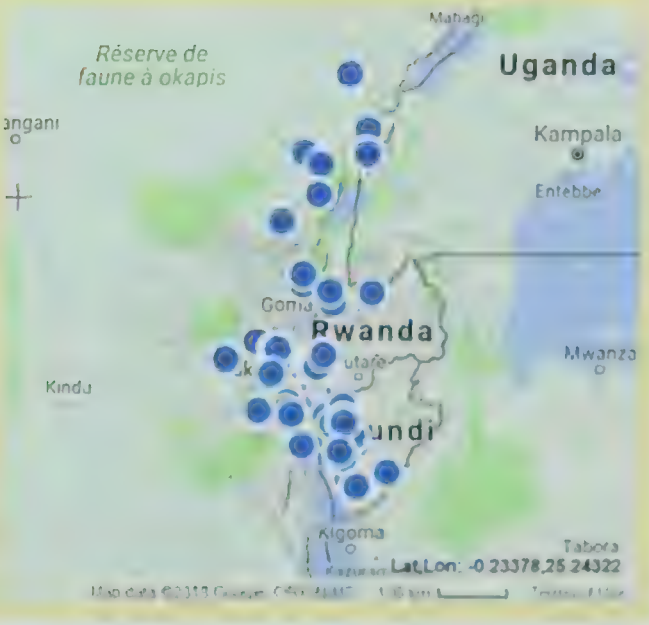
Red List category – **Least Concern (LC).**

Description – Shrub of up to 0.3–2.4(–4) m tall; leaves alternate, lamina elliptic to ovate elliptic, apex acute to acuminate; inflorescence racemose; flowers white, pink or purplish, up to 2.5–4.5 × 2.5–5 mm; calyx with 5 sepals; corolla with tube 3 times longer than the 5 lobes; fruit a berry becoming blue to blackish at maturity.

Vernacular names – Umugura (in kirundi).

Habitat – It grows in montane forests, ericaceous shrub on rocky slopes, also in swamps, at 1700–3500 m altitude.

◄ *Vaccinium stanleyi* – Photos by Eberhard Fischer (©) at Mount Bigugu, Rwanda.



Seed dispersal – Fair, by means of by frugivorous birds and mammals, the berry pulp stays in the gut for only a short time (endozoochory).

Distribution – Endemic to the Albertine Rift and widespread in south-western, south-eastern and western Burundi, eastern Democratic Republic of the Congo, western Rwanda, and south-western Uganda

Red List parameters – AOO: 74,368 km²; EOO: 264 km²; Number of locations: more than 10

Justification – The extent of occurrence (EOO) is far exceeding the 20,000 km^2 upper limit for the Vulnerable category under sub-criterion B1, while its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is known from 104 herbarium specimens collected between 1914 and 2008 and is fairly common. Several collecting sites are from within protected areas (the Bururi Forest Nature Reserve and the Kibira National Park in Burundi, the Nyungwe Forest National Park, the Vulcanoes National Park in Rwanda, the Kahuzi-Biega National Park and the Virunga National Park in Democratic Republic of the Congo, as well as the Rwenzori National Park in Uganda) where the species is believed to be safe. All other sites lie outside protected areas in zones severely impacted by human activities. Due to the rocky ridge habitat requirements, which are unsuitable to cultivation, the species is unlikely to be declining due to habitat loss attributable to agricultural expansion. But it may be under minor threats including planting of alien timber species and logging for firewood. Since the species occurs at more than 10 locations, exceeding the upper limit for the Vulnerable category, the minimal of 2 conditions required for a threat category under criterion B are not fulfilled. Thus, despite its limited AOO, it cannot be assessed in any threat category. Based on the above observations, the species is listed as Least Concern (LC).

Bibliography – Beentje (2006), Fischer & Killmann (2008), Geerinck (2014), Ntore & *al.* (2017f7), Reekmans & Niyongere (1986), Troupin(1985).

Fabaceae

Crotalaria andromedifolia R.Wilczek

Red List category– **Least Concern (LC).**

Description – An erect, much-branched, densely long-hairy suffrutex or small shrub; leaves 3-foliolate, with inrolled margins, estipulate; flowers in subumbelliform racemes; keel distinctly beaked.

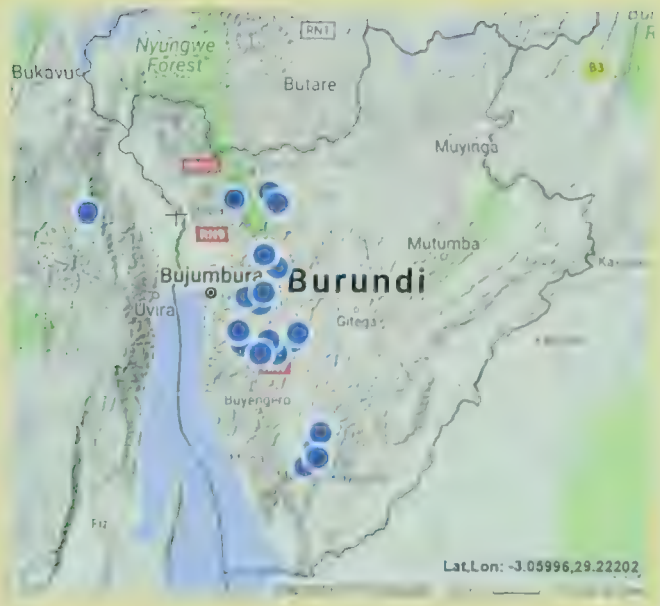
Habitat – It inhabits grasslands, roadsides, disturbed places, at 1850–2600 m altitude.

Seed dispersal – Limited, seeds falling to the ground after pod dehiscence (autochory).

Distribution – Known from the Congo-Nile Divide in Burundi, and from the eastern Democratic Republic of the Congo.

Red List parameters – EOO: 5,317 km^2; AOO: 180 km^2; Number of locations: 8.

Justification – The extent of occurrence (EOO) falls within the limits for the Vulnerable status under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is known from 26 herbarium specimens, collected between 1927 and 1982 and hence is not rare. Two of the 19 collecting localities are near the border of Kibira National Park in Burundi, and near of the Itombwe National Park in the Democratic Republic of the Congo, wherein it is likely present. Many others lie outside of protected areas where grassland habitat is undergoing loss and



◄ ***Crotalaria andromedifolia*** – Photo by Eberhard Fischer (©) taken at Bururi, Burundi.

degradation attributable to conversion of land for agricultural use, heavy grazing pressure, and planting of alien timber species. However, as the species is reported to be present in disturbed places, it is not clear whether any or all of these threats are significantly affecting it. Therefore, the requirement to meet at least 2 out of the three conditions below Criterion B is not met, and as a consequence the species cannot be assessed in a threat category. Based on the above observations, the species is listed as Least Concern (LC).

Bibliography – Ntore & *al.* (2017a34), Polhill (1982), Wilczek (1953).

Entada phaneroneura Brenan

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

Description – A scandent shrub with stems of up to 12 m long; leaflets numerous, narrow, asymmetric at base, pinna-rhachis with green wing-like flanges, inflorescence racemose, pods curved, ± 20 × 3–5 cm, stipitate at base.

Habitat – It occurs in a large variety of habitats, including wooded *Brachiaria–Acacia* savannah, forest with *Strychnos potatorum* and xerophilous thickets with *Capparis tomentosa*, at around 800 m altitude.

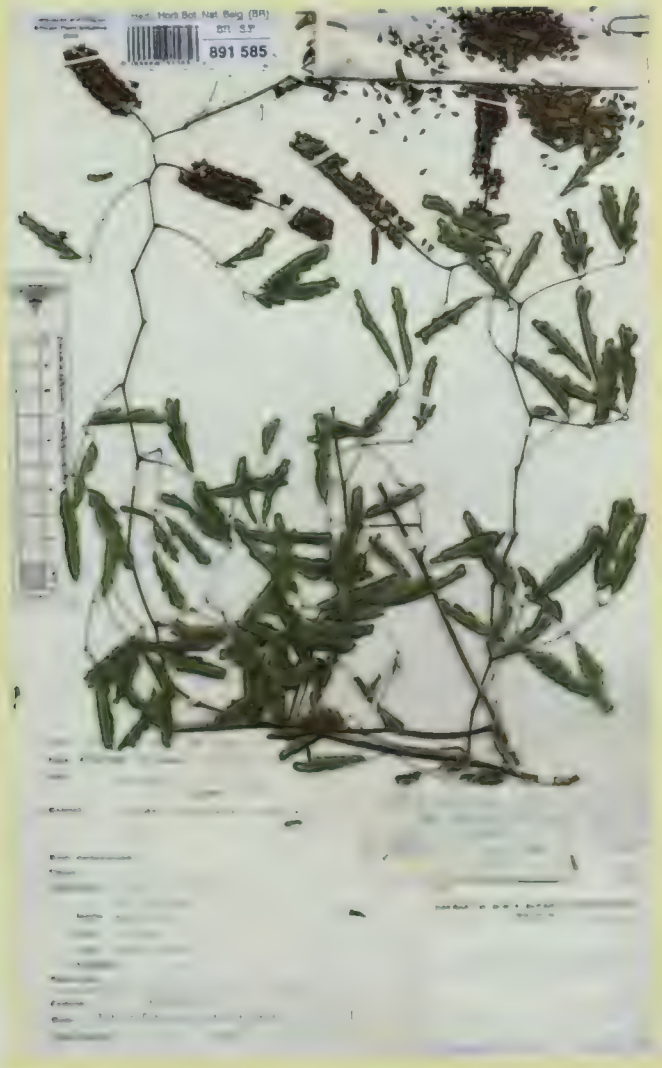
Seed dispersal – Limited, seeds falling to the ground after pod dehiscence (autochory).

Distribution – Only known from the Rusizi Plain in western Burundi. It is likely to be present on the west bank of the Rusizi River in the Democratic Republic of the Congo as that habitat seems similar.

Red List parameters – EOO: 199 km^2; AOO: 45 km^2; Number of locations: 2.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits for the Endangered category under the sub-criteria B1 and B2. The species is known from only 7 herbarium specimens, collected between 1969 and 1984, and seems to be rare. It is likely to be present in the poorly managed Rusizi Natural Reserve which is facing various threats, including a rapid invasion by human populations, agriculture, firewood harvesting and charcoal production, as well as cow breeding within the boundaries of the Reserve. The zone outside the Reserve is suffering the double assault of agriculture and livestock farming as well as massive deforestation consecutive to the rapid human population explosion in the region. As a result, the few remaining natural habitats are being destroyed and lost. Moreover, oil exploration, which was attempted in the past on the Rusizi plain, could restart in the near future (Becker & *al.*, 2010). These various pressures have a devastating impacts on the biodiversity and lead us to assume a continuing decline of the species in EOO and AOO, in quality and extent of habitat, as well as in number of locations and in number of mature individuals. Considering these threats, the species occurs at 2 locations where all individuals present could be drastically threatened. Therefore, based on the above observations, it is listed as Endangered (EN).

Bibliography – Brenan (1978), Ndayishimiye (2011), Ntore & *al.* (2017a35).



◄ ***Entada phaneroneura*** – Scan of the isotype specimen (Lewalle 3238) at BR.

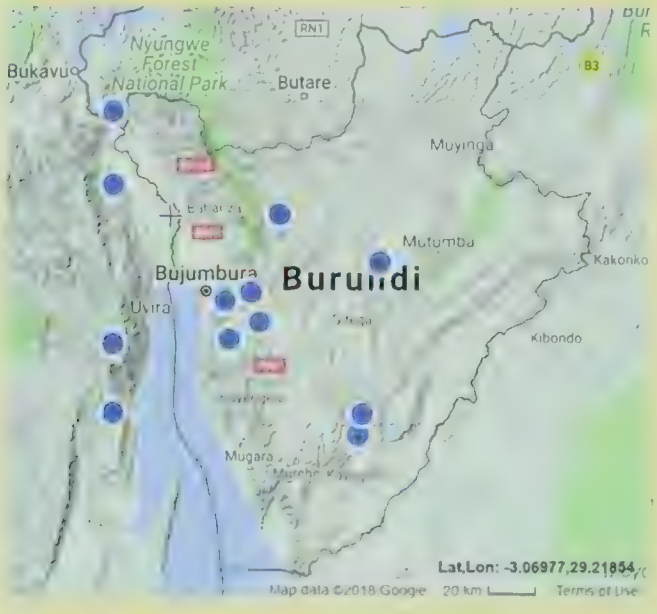
Humularia meyeri-johannis (Harms ex De Wild.) P.A.Duvign.

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B2ab(i,ii,iii,iv,v).

SYNONYMS – *Geissaspis meyeri-johannis* Harms ex De Wild.

DESCRIPTION – A sub-shrub with erect, cylindrical, rather stout, brown stems; leaves 4–6-foliolate; inflorescence a raceme with 6 to 10 flowers; pod with a single article, up to 5 × 5 mm.



► ***Humularia meyeri-johannis*** – Scan of a herbarium specimen (Reekmans 6260) at BR.

HABITAT – It occurs in savannah and grassland, along roads, between 1100 and 1900 m altitude.

SEED DISPERSAL – Limited, seeds falling to the ground after pod dehiscence (autochory).

DISTRIBUTION – Known only from western, south-eastern and central Burundi, southern Rwanda and eastern Democratic Republic of the Congo.

RED LIST PARAMETERS – EOO: 6,689 km²; AOO: 48 km²; Number of locations: 5

JUSTIFICATION – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under the sub-condition B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is known from 12 herbarium specimens, collected between 1905 and 1981, and can be considered as fairly rare. All collecting sites are located in unprotected areas where the species is under severe human pressure either because of agricultural and pastoral activities, or resulting from planting of

alien tree species. This ongoing loss of savannah habitat leads us to infer a continuing decline in quality of habitat, in number of mature individuals, in number of locations, and in AOO and EOO. Considering the habitat loss, the species occurs at 5 locations where all individuals present could be severely influenced by the threat. Hence, based on the above observations, the species is listed as Endangered (EN).

BIBLIOGRAPHY – De Wildeman (1914), Duvigneaud (1954), Ntore & *al.* (2017a36).

Humularia reekmansii Bamps

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B2ab(i,ii,iii,iv,v).

DESCRIPTION – An erect shrub or suffrutex of 1.2–2 m tall; leaves (14 -)16 -20(–22)-foliolate; inflorescence axillary, spiciform to scorpioid; bracts suborbicular, ± 12 × 12 mm; corolla yellow; pods with 1 or 2 semi-orbicular articles, rounded at one side and almost straight at the other, of ± 6 × 5 mm.

HABITAT – It occurs in woodland fringes, savannah and miombo woodland, at 1175–1900 m altitude.

SEED DISPERSAL – Limited, seeds falling to the ground after pod dehiscence (autochory).

► ***Humularia reekmansii*** – Habit (A), leaflet (B), inflorescence (C), flower with bract (D), flower (E), pods (F). Drawing by Antonio Fernandez, Botanic Garden Meise (©).

DISTRIBUTION – Known from southern Burundi and western Tanzania.

RED LIST PARAMETERS – EOO: 9,681 km^2; AOO: 24 km^2; Number of locations: 3.

JUSTIFICATION – The extent of occurrence (EOO) falls in the limits of the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits of the Endangered category under sub-criterion B2. This species is known from only 7 herbarium specimens collected between 1972 and 1997, and can be considered rare. All collecting sites lie outside of protected areas, and appear to suffer from a degradation and loss of savannah and miombo vegetation caused by agriculture activities and livestock farming. The localities from Tanzania are situated around 350 km away from the remaining Burundian ones and this relative isolation suggests a restriction of gene exchange with the populations from Burundi. These threats leads us to infer a continuing decline in the EOO and the AOO, in number of locations, in quality of habitat, and in number of mature individuals. Considering the habitat loss, the species is believed to occur at 3 locations. Hence, based on the above observations, it is listed as Endangered (EN).

BIBLIOGRAPHY – Bamps (2009), Ntore & *al.* (2017a37).

Leptoderris burundiensis Bamps & Champl.

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B2ab(ii,iii,v).

DESCRIPTION – A climbing shrub or liana; leaves 5-foliolate, densely white to grey-tomentose on the lower surface; inflorescence paniculate, with spiciform branches; corolla yellow to yellow-greenish; pods oblong, papyraceous, ± 7 × 2 cm, with 1 seed.

◄ ***Leptoderris burundiensis*** – Portion of stem with leaves and inflorescence (A), indumentum at lower surface of leaflet (B), flower (C), staminal tube and standard, (D), pod (E). Drawing by Antonio Fernandez, Botanic Garden Meise (G).

Habitat – It occurs in a large variety of habitats, including high-elevation forests, galleries forests, and savannah, at 1700–2400 m altitude.

Seed dispersal – Limited, seeds falling to the ground after pod dehiscence (autochory).

Distribution – Endemic to the Albertine Rift, occurring in southern Burundi, in south-western Rwanda, and in eastern Democratic Republic of the Congo.

Red List parameters – AOO: 8,375 km^2; EOO: 72 km^2; Number of locations: 5.

Justification – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under the sub-condition B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. This species is known from 10 herbarium specimens, collected between 1957 and 2008, and can be considered as fairly rare. Two out of the six collecting sites lie within protected areas (the Nyungwe National Park in Rwanda and the Kahuzi-Biega National Park in the Democratic Republic of the Congo). The remaining collecting sites occur outside any protected area, and are suffering from an exceptionally high environmental pressure caused by human population growth. In those areas, the fragile small relicts of natural vegetation are being degraded and lost by conversion for agriculture, overgrazing and trampling by livestock. This habitat loss and degradation lead us to predict a continuing decline in the AOO, in quality of habitat and in number of mature individuals. Considering this loss, the species occurs at 5 locations where all individuals could be drastically affected by this threat. Hence, based on the above observations, the species is listed as Endangered (EN).

Bibliography – Bamps & Champluvier (2012), Ntore & *al.* (2017a38).

Tephrosia argyrolampra Harms

Red List category – **Endangered (EN).**

IUCN criteria – B2ab(iii,v).

Description – A woody herb with erect stems; leaves 3–5-foliolate, with leaflets of up to 10 × 4 cm, densely appressed silvery hairy below; flowers purple; ovules 7 or 8; pods unknown

Habitat – It inhabits grassland, at 1260–1400 m altitude.

Seed dispersal – Limited, seeds falling to the ground after pod dehiscence (autochory).

Distribution – Only known from north-eastern Burundi and north-western Tanzania.

Red List parameters – EOO: not applicable; AOO: 18 km^2; Number of locations: 2.

Justification – With only two sites where the species has been observed, it is not possible to calculate an Extent of Occurrence (EOO). The area of occupancy (AOO) falls within the limits of the Endangered category under sub-criterion B2. The species is known from only two old herbarium specimens: the type specimen which was collected in 1911 in north-eastern Burundi, and destroyed during the Second World War in Berlin, and another specimen collected in 1926 in north-western Tanzania. The two collecting sites are widely separated from each other and located in unprotected areas and are now more and more heavily disturbed by expanding crop cultivation and livestock farming. If the species is still in existence, it is believed to be drastically reduced. Considering the habitat loss, the species

► ***Tephrosia argyrolampra*** – Scan of the neotype specimen (Peter 38511) at K.

is reported to occur at two locations where all individuals could be seriously threatened. Therefore, based on the above observations, the species is listed as Endangered (EN). It would be useful to search for it in all the suitable habitats to try and relocate it, since it may effectively already be extinct in the wild.

Bibliography – Gillett & *al.* (1971), Harms (1914), Ntore & *al.* (2017e1).

Vigna unguiculata (L.) Walp. subsp. *burundiensis* Pasquet

Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(iii,v).

Description – A climbing herb up to 1–3 m long, differs from typical *V. unguiculata* mainly in the calyx lobes being longer than the tube and measuring 0.5–1.4 cm.

Habitat – It grows at 1000–1670 m altitude.

Seed dispersal – Limited, seeds falling to the ground after pod dehiscence (autochory).

Distribution – Known from central and western Burundi and eastern Democratic Republic of the Congo. According to Pasquet (1993), it is likely to be present in other high altitude zones of eastern Africa, such as in Rwanda, Uganda and Kenya.

Red List parameters – EOO: 922 km²; AOO: 27 km²; Number of locations: 3.

Justification – The extent of occurrence (EOO) and the area of occupancy both fall within

the limits for the Endangered category under sub-criteria B1 and B2. The subspecies is known from only 4 herbarium specimens collected between 1972 and 2008, and may be considered as rare. All collecting sites lie outside protected areas, and are the scene of agricultural activities. As the natural habitat recedes due to the hoe, it is presumed that the subspecies is under continuing decline in number of mature individuals. Considering the habitat loss, the subspecies occurs at 3 locations where all individuals could be seriously threatened. Hence, based on the above observations, this subspecies is listed as Endangered (EN).

NOTE – The species *Vigna unguiculata* comprises a total of 15 infrapsecific taxa (subspecies and varieties) and as a whole has a wide distribution. Some forms are widely cultivated throughout the tropics.

BIBLIOGRAPHY – Pasquet (1993).

◄ ***Vigna unguiculata* subsp. *burundiensis*** – Scan of the holotype specimen (Le Marchand & Maréchal 2449) at BR.

Zornia punctatissima Milne-Redh.

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B2ab(ii,iii,v).

DESCRIPTION – A perennial, densely tufted herb with erect glandular-punctate stems to 40 cm tall, leaves 2-foliolate, densely glandular-punctate on both surfaces; flowers as long as the bracts; petals yellow; pod up to 17 mm long, with 7 seeds, the segments ± 2.5 × 3 mm.

HABITAT – It grows amongst burnt-off bases of previous seasons' growth and occurs on the margins of cultivated land in grassland and *Brachystegia longifolia* woodland at 1,400 m altitude.

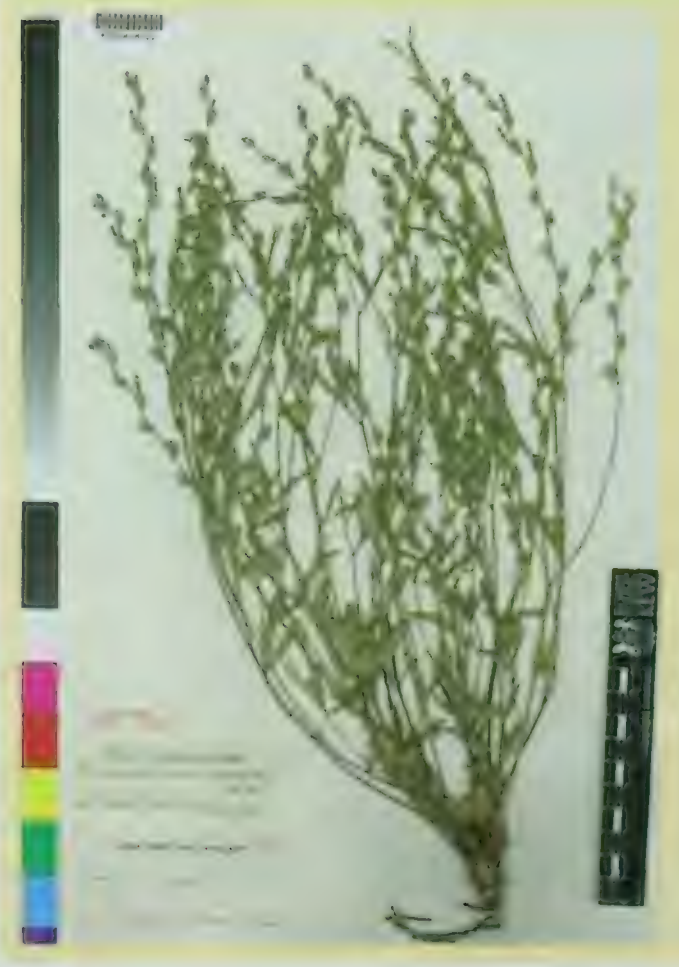
SEED DISPERSAL – Limited, by pod segments falling to the ground (autochory).

DISTRIBUTION – Known from southern and western Burundi and from south-western Tanzania.

RED LIST PARAMETERS – EOO: 16,804 km^2; AOO: 36 km^2; Number of locations: 3.

JUSTIFICATION – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under the sub-condition B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is known from only 6 herbarium specimens collected between 1962 and 1981 and can be considered rare. Only two collecting sites occur within protected areas (the Kibira National Park in Burundi and the Lupa North Forest Reserve in Tanzania). The two others fall outside of any protected area, in zones under human pressure including livestock farming. The site from Lupa in Tanzania is isolated by distance from the main distribution area in Burundi, resulting in genetic isolation of its population. The pressure upon the grassland and woodland habitats contribute to the loss of habitat which leads us to infer a continuing decline in AOO and in number of mature individuals. However, since the species has also been reported from the edge of cultivated land, it might be able to partially survive in agricultural areas. Considering the habitat loss, the species occurs at 3 locations. Therefore, based on the above observations, the species is listed as Endangered (EN).

BIBLIOGRAPHY – Gillett & *al.* (1971), Ndayishimiye (2011), Ntore & *al.* (2017e2).



◄ ***Zornia punctatissima*** – Scan of the holotype specimen (Boaler 718) at K.

Gentianaceae

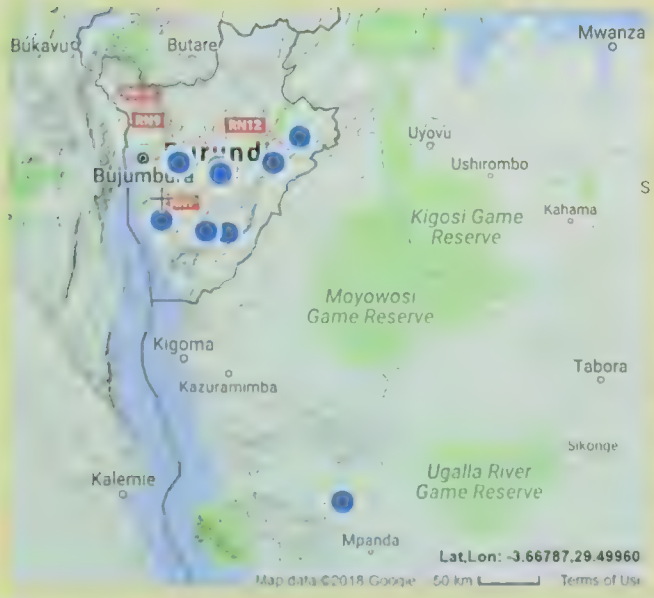
Faroa acuminata P.Taylor

Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(iii).

Description – A small annual herb of up to 10 cm tall; flowers in axillary dense fascicles; calyx campanulate, lobes acuminate, with divaricate apex; corolla with a 2 mm long tube and 1 mm long ovate and acuminate lobes; capsule with 8 seeds.

► ***Faroa acuminata*** – Photo by Salvator Ntore (©) taken at the Nile's Source, Burundi.



Habitat – It grows in grassland on rocky summits and on lateritic soil, between 1300 and 2340 m altitude.

Seed dispersal– Limited, seeds shed from a slit in the bivalved capsule.

Distribution – Found in the southern half of Burundi and in western Tanzania.

Red List parameters – EOO: 21,623 km^2; AOO: 99 km^2; Number of locations: 5.

Justification – The extent of occurrence (EOO) exceeds the upper limit for the Vulnerable status under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is known from 11 herbarium specimens, collected between 1952 and 2014, and can thus be considered as fairly rare. It is found in various rocky areas of suitable high altitude habitat and can be locally abundant (Ntore, pers. obs. 2014). Due to its specific habitat requirements, rocky summits, which are generally unsuitable for cultivation, this annual plant is unlikely to be declining due

to agricultural expansion. Its main threat is caused by planting of alien tree species and trampling by cattle. Considering the habitat loss, the species occurs at 5 locations where all individuals could be pushed to extinction. Hence, based on the above observations, it is listed as Endangered (EN).

BIBLIOGRAPHY – Ntore & *al.* (2017a39), Taylor (1971).

Gesneriaceae

Streptocarpus burundianus Hilliard & B.L.Burtt

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B1ab(iii,v)+2ab(iii,v).

DESCRIPTION – A perennial acaulescent and unifoliate herb; leaf with oblong to elliptic lamina, 30–35(–60) × 12–15 cm; inflorescences 1 to 3, at the base of petiole, with numerous white flowers; corolla 8–10 mm long, tubular-campanulate; capsule linear, ± 10 mm long.

HABITAT – It occurs in gallery forests, on rocks, between 1650 and 2000 m altitude.

► ***Streptocarpus burundianus*** – Photos by Eberhard Fischer (©) taken at Kumuyange, Burundi.

Seed dispersal – Limited, seeds falling to the ground (autochory).

Distribution – Known only from Gakara, on the western slope of the Congo-Nile Divide, and from the Siguvyaye Valley and the Muyange and Kwitaba Hills in southern Burundi.

Red List parameters –EOO: 517 km^2; AOO: 45 km^2; Number of locations: 3.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits for the Endangered category under sub-criteria B1 and B2. The species is known from only 5 herbarium specimens collected between 1969 and 1974 and should be considered as rare. With the exception of one collecting site located in the Bururi Forest Nature Reserve, all known occurrences lie outside protected areas and are badly impacted by human activities. Unfortunately the locality (rocks in Siguvyaye Valley) within the Nature Reserve has been deforested and the species was searched for in vain on the now sun-exposed rocks, as no suitable habitats are left (Fischer, pers. obs. 2012). The small remaining gallery forests habitat that shelter it elsewhere are doomed to the edge of the axe, the machete, and the teeth of livestock. Considering this factors that contribute to this species' decline, the number of locations is estimated at 3. Thus, based on the above observations, it is listed Endangered (EN).

Bibliography – Hilliard & Burtt (1971), Ntore & *al.* (2017a40).

Hypericaceae

Harungana montana Spirlet emend. Bamps

Red List category – **Vulnerable (VU).**

IUCN criteria – B1ab(iii,v)+2ab(iii,v).

Description – Shrub or tree up to 15–20 m tall; leaves opposite; petiole up to 1–2 cm long; lamina elliptic to ovate, 6.5–8.5(–20) × 4.5–10 cm, obtuse and rounded both at base and apex; calyx ± 2 mm long; corolla up to 3 mm long, white; stamens 3–4 per bundle; fruit a spherical drupe.

Vernacular Names – Kadwamuko (in mashi), Mushombo (in kirega).

Habitat – Montane rainforests, at 2000–2300 m altitude.

Seed dispersal – Effective, mostly by fruit-eating (i.e. frugivorous) birds excreting the seeds elsewhere (endozoochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, south-western Rwanda and eastern Democratic Republic of the Congo.

Red List parameters – EOO: 11,912 km^2; AOO: 90 km^2; number of locations: 6.

Justification – The extent of occurrence (EOO) falls within the limits for the Vulnerable status under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is known from 13 specimens collected

▼ ***Harungana montana*** – Photo by Eberhard Fischer (©) taken at the Kamiranzovu Swamp, Rwanda.

between 1932 and 1999, and may be considered as fairly rare. Three of the collecting sites fall within protected areas (the Nyungwe National Park in Rwanda, and the Kahuzi National Park in the Democratic Republic of the Congo) one other close to a protected area (Itombwe Nature Reserve), and the rest outside. As a fourth site is near the southern border of the Kibira National Park in Burundi, the species is likely also present within it. All other sites lie outside protected areas where the remaining tracts of montane forest habitat are meeting their end at the blade of an ax or machete. This loss of forest patches leads us to predict a continuing decline in extent and quality of habitat as well as number of mature individuals. By considering this threat, the species occurs at 6 locations, where all individuals could be severely affected by it. Based on the above observations, the species is listed as Vulnerable (VU).

Bibliography – Bamps (1970), Fischer & Killmann (2008).

Lamiaceae

Achyrospermum micranthum Perkins

Red List category – **Vulnerable (VU)**.

IUCN criteria – B2ab(iii).

Description – Subshrub of 1–2 m tall; leaf adpressed pubescent on the nerves below, base decurrent on the petiole; inflorescence axillary, of dense spikes; corolla ± equaling the calyx in length, white to purpurish.

Habitat – Montane rainforest, bamboo forest, at 1200–2300 m altitude.

Seed dispersal – Effective, nutlets with apical hairs or scales, which can presumably assist dispersal by wind.

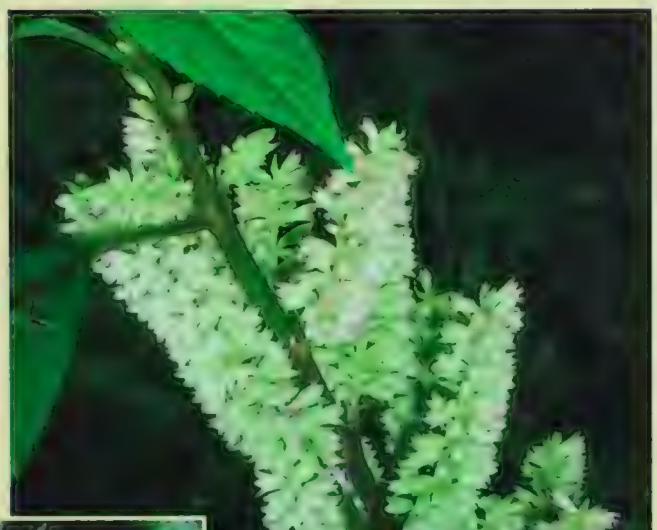
Distribution – Endemic to the Albertine rift, in western Burundi, western Rwanda, and eastern Democratic Republic of the Congo.

Red List parameters – EOO: 44,520 km^2; AOO: 99 km^2; Number of locations: 6.

Justification – The extent of occurrence (EOO) exceeds the upper limit for the Vulnerable status under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Vulnerable category under sub-criterion B2. The species is known from 17 herbarium specimens collected between 1914 and 2016 and could be considered as moderately rare. All those from Rwanda and Burundi fall within protected areas (Kibira National Park in Burundi and Nyungwe National Park in Rwanda). In the Democratic Republic of the Congo, one collecting site falls within the Kahuzi-Biega National Park, while the other two are not located in a protected area where they are truly hammered by human activities such as agriculture and farming. In Burundi, the species has only been reported by Nzigidahera (2016) in the Kibira National Park and by Kankunze (2015), without voucher, in the Bururi Nature Reserve in south-western Burundi. The latter observation could not be confirmed. Considering these threats, the species occurs at 6 locations and we infer a decline in extent and quality of habitat. Therefore, based on the above observations, the species is assessed as Vulnerable (VU).

Bibliography – Bruce (1936), Habiyaremye & Nzigidahera (2016), Perkins (1913).

► ***Achyrospermum micranthum*** – Photos by Eberhard Fischer (©) taken at Gisakura, Rwanda.



Alvesia clerodendroides (T.C.E.Fr.) B.Mathew

RED LIST CATEGORY – **Vulnerable (VU).**

IUCN CRITERIA – B1ab(iii)+2ab(iii).

SYNONYMS – *Plectranthastrum clerodendroides* T.C.E.Fr.

DESCRIPTION – A perennial herb with creeping branched rhizome, forming clumps; stems to 40 cm tall; leaves ovate to elliptic; inflorescence a thyrse with flowers on long pedicels; fruiting calyx constricted at the mouth; corolla white, 1–1.2 cm long.

HABITAT – It occurs in seasonally open bush on sandy soil, in fire-maintained grassland with patches of woodland, in heathland between rocks, at between 1430 and 2300 m altitude.

SEED DISPERSAL – Limited, probably by nutlets clinging to the fur of animals (epizoochory).

DISTRIBUTION – Known from the Albertine Rift, occurring in western Burundi and in western Tanzania, as well as in the eastern Democratic Republic of the Congo.

RED LIST PARAMETERS – EOO: 17,444 km^2; AOO: 180 km^2; Number of locations: 6.

JUSTIFICATION – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is known from 29 herbarium specimens, collected between 1905 and 2014, and should be considered as fairly common. Five out of these collecting sites lie inside protected areas (the Bururi Forestry Natural Reserve and the Kibira National Park in Burundi, and the Gombe National Park in Tanzania). The other ones lie outside protected areas in zones badly impacted by human activities including livestock farming and planting alien species. Considering these threats,

◄ ***Alvesia clerodendroides*** – Photo by Eberhard Fischer (©) taken at Teza, Burundi.

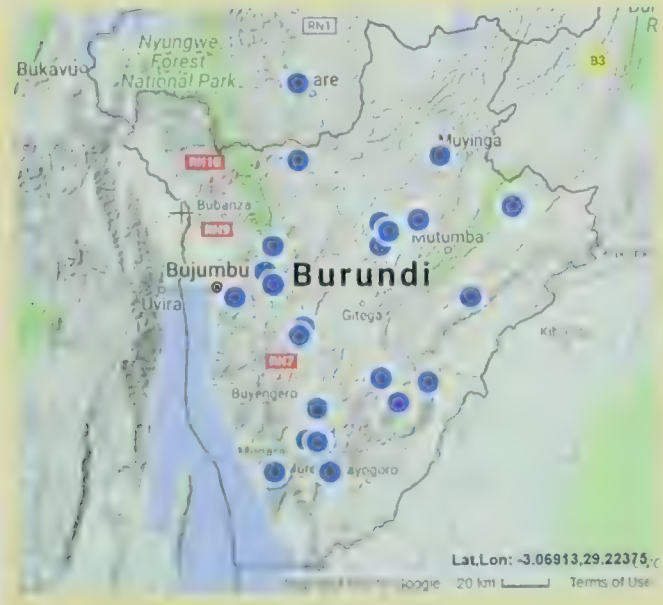
the species occurs at 6 locations and we infer a decline in extent and quality of habitat. Therefore, based on the above observations, the species is assessed as Vulnerable (VU).

Bibliography – Hepper (1972), Ntore & *al.* (2017a41), Paton & *al.* (2009).

Leucas urundensis Robyns & Lebrun

Red List category – **Least Concern (LC)**.

Description – A perennial aromatic herb with woody rhizome, up to 1.5 m tall; leaves sessile, linear to oblanceolate; inflorescence a thyrse, with 1–5 pseudo-verticills; corolla white, 10–12 mm long; nutlets ± 2 × 1.5 mm.



▼ ***Leucas urundensis*** – Photo by Eberhard Fischer (©) taken at Bururi, Burundi.

Vernacular names – Agatongotongo gatoyi (in kirundi).

Habitat – It occurs in diverse grasslands on quartzite, in grazed savannahs, in upland forests, in gallery forests and in fallows, at 1650–2300 m altitude.

Seed dispersal – Limited, by epizoochory of nutlets.

Distribution – Found throughout Burundi and in southern Rwanda.

Red List parameters – EOO: 12,431 km²; AOO: 96 km², Number of locations: not applicable.

Justification – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. This species is known from 35 herbarium specimens collected between 1932 and 1983 and can be regarded as fairly common. Only one collecting site lies within a protected area, the Kibira National Park in Burundi. Most of the others lie outside protected areas where they are under increasing human pressure. However, as the species is abundant and also grows in grazed prairie and in fallow fields, it doesn't appear to be seriously threatened by agricultural and farming activities. Consequently, the IUCN conditions that refer to the number of locations and decline are not met. Therefore, based on the above observations, the species is listed as Least Concern (LC).

Bibliography – Angulo (1970), Ntore & *al.* (2017a42), Sebald (1980).

Ocimum urundense Robyns & Lebrun

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B2ab(ii,iii,iv,v).

SYNONYMS - *Becium urundense* (Robyns & Lebrun) A.J.Paton, *B. grandiflorum* (Lam.) Pic. Serm. var. *urundense* (Robyns & Lebrun) Sebald.

DESCRIPTION - An aromatic perennial suffrutex of up to 25 cm tall, sprouting from burnt stumps; leaves with revolute margin; inflorescence a lax thyrsus with 6-flowered cymes; corolla pinkish, 7–8 mm long; stamens exserted; nutlets producing mucilage when wet.

◄ ***Ocimum urundense*** Scan of a herbarium specimen (Elskens 234) at BR.

HABITAT – It occurs in areas quite or almost denuded of trees, on stony grey soil, in burnt-over grassland, in loosely wooded savannah, between 1600 and 1900 m altitude.

SEED DISPERSAL – Limited, by nutlets clinging to animal fur (epizoochory).

DISTRIBUTION – Known from south-western, central and north-eastern Burundi and from western Tanzania.

RED LIST PARAMETERS – EOO: 5,827 km²; AOO: 63 km²; Number of locations: 4 or 5.

JUSTIFICATION – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. It is known from 10 herbarium

specimens, recorded between 1922 and 1978, and can thus be considered fairly rare, but is said to be locally abundant in Tanzania. With the exception of one collecting site located within the Ruvubu National Park in Burundi, all collecting sites lie outside protected areas in zones subject to growing human population pressure leading to the loss of grassland habitats. The species is adapted to fire and likely requires it for survival. As bushfires are prohibited, the species can be pushed towards severe threat being outcompeted by other species. Moreover, some localized habitat degradation due to human activities such as agriculture could be observed. Presently, the species occurs at 4 or 5 locations where all individuals could be severely threatened. Hence, based on the above observations, it is listed as Endangered (EN).

Bibiography – Paton (1995), Ntore & *al.* (2017a43), Sebald (1989).

Lauraceae

Beilschmiedia rwandensis R.Wilczek

Red List category – **Least Concern (LC)**.

Description Tree of up to 20 m tall; leaves alternate, lamina elliptic to lanceolate, 10–20 × 2–4 cm, acuminate at apex, acute to rounded at base, glabrous; flowers in terminal panicles of up to 10–13 cm long; perianth greenish to yellowish, up to 1,5–2,2 mm long; anthers 2-celled, opening by 2 valves; fruit an elliptic drupe without basal cupula, up to 4–6 cm long.

Habitat – Forest, at 2100–2500 m altitude.

Seed dispersal Fairly effective, possibly by animals eating the fruit and excreting the seeds, or accidentally scattering them (ectozoochory, dysochory).

▲ ◄ ***Beilschmiedia rwandensis*** – Photos by Eberhard Fischer (©) taken at Uwinka, Rwanda.

DISTRIBUTION – Known from the Congo-Nile Divide, in western Burundi and south-western Rwanda.

RED LIST PARAMETERS EOO: 45 km^2; AOO: 27 km^2; Number of locations: not applicable.

JUSTIFICATON – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits for the Endangered category under the sub-criteria B1 and B2. The species is known from 6 herbarium specimens collected between 1956 and 1971 showing it is fairly rare. All collecting sites fall within two well-managed protected areas (the Nyungwe National Park in Rwanda and the Kibira National Park in Burundi) and are considered to be safe. Thus, despite its restricted distribution, the species does not experience any threat and there is no evidence for a continuing decline. Hence, the species cannot be assessed in any threat category and is therefore assessed as Least Concern (LC).

BIBLIOGRAPHY – Fischer & Killmann (2008), Wilczek (1974).

Lentibulariaceae

Utricularia troupinii P.Taylor

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B1ab(iii)+2ab(iii).

DESCRIPTION Small terrestrial carnivorous herb; leaves few, on stolons, lamina obovate, up to 6 mm long; traps subterraneous, numerous, on leaf petioles, stalked, with long appendages.

◄ ***Utricularia troupinii*** - Photo by Eberhard Fischer (©) taken at Mount Teza, Burundi.

up to 0.6 mm long; inflorescence an erect raceme, up to 5–18 cm long; flowers yellow, 6–9 mm long, lower lip ovate, spur cylindrical.

Habitat – It occurs in wet or swampy prairies, at 1900–2500 m altitude.

Seed dispersal – Limited, by wind (anemochory) or vegetatively by turions.

Distribution – Only known from the Congo-Nile Divide, occurring in western Burundi and south-western Rwanda.

Red List parameters – EOO: 2,835 km^2; AOO: 81 km^2; Number of locations: 3.

Justificaton – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits for the Endangered category under the sub-criteria B1 and B2. The species is known from 12 herbarium specimens, collected between 1959 and 1983, and should be considered as fairly rare. Most of the collecting sites lie inside protected areas (3 within the Kibira National Park in Burundi, and 2 within the Nyungwe National Park in Rwanda), while 3 others are situated outside of protected areas where human population growth is driving swampy prairie destruction, leading to the detriment of the aquatic biodiversity that they shelter. Since the swamps are being drained for cultivation, this obligate wetland species is now inevitably declining in extent and population size. Therefore, based on the above observations, it is here listed as Endangered (EN).

Bibliography – Fischer & Killmann (2008), Ntore & *al.* (2017e), Taylor (1971, 1972).

Loranthaceae

Agelanthus keilii (Engl. & K.Krause) Polhill & Wiens

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv).

Synonyms – *Tapinanthus keilii* (Engl. & K.Krause) Danser, *Loranthus keilii* Engl. & K.Krause, *L. becquetii* Balle.

Description – A hemiparasitic epiphytic shrub of up to 50–100 cm tall, puberulous, soon glabrescent; leaves subopposite, lamina ovate-elliptic to ovate, 5–11 × 1–4 cm, obtuse to acuminate at apex; flowers 8 to 12 per umbel, clustered in leaf axils; corolla 5-lobed, dull yellow to red with mauve apex, 4–4.5 cm long.

Habitat – It is found in forest edges, wooded grassland, parasitic on *Ficus*, *Bridelia* and *Combretum*, between 1000 and 1450 m altitude.

Seed dispersal – Effective, by birds eating the fruits and excreting the seeds (endozoochory).

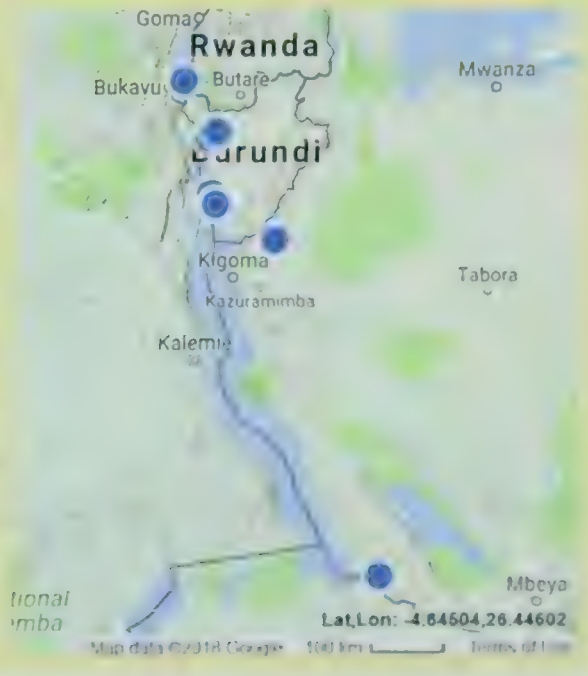
Distribution – Known from western Burundi and south-western Rwanda as well as from western and south-western Tanzania.

Red List parameters – EOO: 22,032 km^2; AOO: 72 km^2; Number of locations: 5.

JUSTIFICATION – The extent of occurrence (EOO) exceeds the upper limit for the Vulnerable status under sub-criterion B1), whereas its area of occupancy (AOO) complies with the criteria for the Endangered status under sub-criterion B2. The species is known from 8 herbarium specimens collected between 1932 and 1984, and could be considered as rare. All collecting localities are from outside protected areas, within a zone more and more heavily populated, where gallery forests and wooded grassland are doomed to the machete and the hoe. This loss of forest habitat inevitably leads to a decline of host plants for this parasitic species. Moreover, its seed dispersal potentials will also be reduced due to the decline of avian fauna. The species has a disjointed population in south-western Tanzania, at ± 500 km away from its main area in Burundi and we may assume it to be genetically isolated. These threats lead us to infer an ongoing decline in population size, in extent and quality of habitat, in mature individuals, as well as in EOO and AOO. Considering the habitat loss, it occurs at 5 locations. Therefore, the species is listed as Endangered (EN).

BIBLIOGRAPHY – Ntore & *al.* (2017a44), Polhill & Wiens (2000).

◄ ***Agelanthus keilii*** – Photos by Eberhard Fischer (©) taken at Pindura-Bweyeye, Rwanda.



Agelanthus myrsinifolius (Engl. & K.Krause) Polhill & Wiens

RED LIST CATEGORY – **Vulnerable (VU)**.

IUCN CRITERIA – B1ab(iii)+2ab(iii).

SYNONYMS – *Loranthus myrsinifolius* Engl. & K.Krause, *Tapinanthus myrsinifolius* (Engl. & K.Krause) Danser.

DESCRIPTION – A hemiparasitic epiphytic shrub of up to 100 cm tall, glabrous, leaves opposite to subopposite, lamina leathery, ovate-elliptic to ovate, 0.5–2.5 × 0.4–1.5 cm, obtuse and rounded at apex; flowers 2 or 3 per umbel, clustered in leaf axils, corolla 5-lobed, yellow with dark red apex, 4–4.5 cm long.

Habitat – Montane or swamp forests and heath zone, parasitic on *Myrsine* and *Erica johnstonii*, at 1900–3300 m altitude.

Seed dispersal – Effective, by birds eating the fruits and excreting the seeds (endozoochory).

Distribution – Known from the Albertine Rift, occurring in western Burundi, south-western Rwanda and eastern Democratic Republic of the Congo.

Red List parameters – EOO: 11,812 km^2; AOO: 207 km^2; Number of locations: 8.

► ***Agelanthus myrsinifolius*** – Photos by Eberhard Fischer (©) taken at respectively Mount Muzimu and Mount Bigugu, Rwanda.

Justification – The extent of occurrence (EOO) falls within the limits for the Vulnerable status under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. It is represented in herbaria by 35 specimens collected between 1907 and 1976 and can be considered as fairly common. Fortunately, nine of the collecting sites are from inside protected areas (the Bururi Forest Nature Reserve and the Kibira National Park in Burundi, the Nyungwe National Park in Rwanda, and the Kahuzi-Biega National Park in the Democratic Republic of the Congo) where there is no major threat of habitat loss. The other ones lie in areas where relict forests are facing several pressures including the axe and the hoe. This loss of forest habitat inevitably leads to the decline of host plants for this parasitic species. These pressures lead to infer a decline in extent and quality of habitat. It might be that this species is able to parasitize species other than the ones on which it has been observed, leading to a less rapid decline than thought, but there is no information to corroborate this idea. On the other hand, regarding the threats it is believed to occur at only 8 locations where its individuals present could be drastically threatened by the loss of hosts. Hence, based on the above information the species should be assessed as Vulnerable (VU).

Bibliography – Fischer & Killmann (2008), Ntore & *al* (2017[8]), Polhill & Wiens (1998).

Cincinnobotrys speciosa (A.Fern. & R.Fern.) Jacq.-Fél.

Red List category – **Vulnerable (VU)**.

IUCN criteria – B1ab(iii)+2ab(iii).

Synonyms – *Gravesiella speciosa* A.Fern. & R.Fern., *G. speciosa* A.Fern. & R.Fern. var. *grandifolia* A.Fern. & R.Fern.

Description – A small, acaulous, rhizomatous herb; leaves 1 to 3, rosulate, long-petiolate, petiole 3–40 cm long, lamina ovate-orbicular, 4.5–22 × 4.5–25 cm, acuminate at apex, cordate a base, with serrate margin; inflorescence a scorpioid cyme, up to 18–45 cm long, with 3 to 26 flowers; flowers 4-merous; corolla white, up to 2–3 cm in diameter, with petals broadly elliptic; stamens 8.

◄ ▼ ***Cincinnobotrys speciosa*** – Photos by Eberhard Fischer (©) taken at Gisakura, Rwanda.

Habitat – It occurs in rain forest and gallery forest, in humid places in valleys, on rocks, on river banks, sometimes epiphytic, between ± 1200 and ± 2350 m altitude.

Seed dispersal – Limited, by means of a dry capsule, opening and releasing masses of very small seeds (autochory).

Distribution – Endemic to the Albertine Rift, known from western Burundi, western Rwanda and western Tanzania, as well as from eastern Democratic Republic of the Congo.

Red List parameters – EOO: 11,400 km²; AOO: 60 km²; Number of locations: 6

Justification – The extent of occurrence (EOO) falls within the limits for the Vulnerable status under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered status under sub-criterion B2. This species is known from 20 herbarium specimens collected between 1948 and 1980, and should be considered as uncommon. Only 4

out of the 14 collecting sites lie within protected areas (the Nyungwe National Park in Rwanda, the Irangi Reserve in the Democratic Republic of the Congo, and the Gombe National Park in Tanzania). The 10 other ones are situated outside protected areas, where pressure of human population growth is causing damage on remnant galleries forests through wood harvesting and clearing for agriculture. Considering this threat, the species is believed to be found at 6 locations where all individuals present could be severely threatened. Therefore, based on the above information it is assessed as Vulnerable (VU).

Bibliography –Fischer & Killmann (2008), Fischer & *al.* (2010), Jacques-Félix (1976), Ntore & *al.* (2017a45), Wickens (1975).

Dissotis alata A.Fern. & R.Fern.

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(i,ii,iii,iv)+2ab(i,ii,iii,iv).

Botany – A woody herb to 1.2 m high; branchlets 4-winged (wings 1.5–2 mm wide, narrowing at the nodes); inflorescence terminal, 1-flowered or with 2- to 3-flowered cymes; calyx tube 7–8.5 mm long, densely appressed setose, without scale-like appendages; corolla purple, up to 2.4 cm long.

◄ ***Dissotis alata*** – Flowering twig (A), part of stem (B), leaf upper surface (C), leaf lower surface (D), flower bud (E), flower (F), sepal, dorsal view (G), tooth between calyx lobes (H), hypanthium appendages (I, I'), outer whorl stamen (J), inner whorl stamen (K), fruit (L). Drawing by A. Diniz, Jardim Botânico da Universidade de Coimbra (©), reproduced with permission from Fernandes & Fernandes (1960).

Habitat – It is found in valley grassland, at 1350–1900 m altitude.

Seed dispersal – Limited, by capsules releasing masses of very small seeds (autochory).

Distribution – It is known from south-eastern Burundi and western Tanzania.

Red List parameters – EOO: 304 km^2; AOO: 27 km^2; Number of locations: 3.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) fall both within the limits for the Endangered status (EN) under the subcriteria B1 and B2. The species is known from 3 herbarium specimens, collected between 1952 and 1976, showing that it can be considered as rare. All other specimens originate from unprotected areas under grassland subjected to conversion for crop cultivation and livestock farming. This loss of habitat leads us to infer a continuing decline in number of locations (estimated at 3), area, quality of habitat, and also in AOO and EOO. However, as the species has a rather wide altitudinal amplitude throughout its distribution range, it is likely it will survive some of the threats. Based on the above observations, the species is listed as Endangered (EN).

Bibliography – Fernandes & Fernandes (1960), Ntore & *al.* (2017a46), Wickens (1975).

Dissotis longisepala A.Fern. & R.Fern.

Red List category – **Critically Endangered (Possibly Extinct) (CR (PE))**.

IUCN criteria – B2ab(ii,iii).

Description – A shrub to 1.2 m high; stem and branches 4-angular upwards; inflorescence terminal; calyx densely covered with whitish stellate hairs, free sepal lobes longer than calyx tube; corolla mauve.

Habitat – It occurs in savannah with *Hyparrhenia rufa*, in swamps, on humid soil, at 800–1280 m altitude.

Seed dispersal – Limited, by dry capsules, opening and releasing numerous small seeds (autochory).

Distribution – Only known from eastern Burundi.

Red List parameters – EOO: not applicable; AOO: 18 km^2; Number of locations: 1.

Justification – With only two separated collecting sites where the species was observed, it is not possible to calculate an Extent of Occurrence (EOO). The area of occupancy (AOO) falls within the limits for Endangered status (EN) under sub-criterion B2. The species is historically known from 6 herbarium specimens collected between 1951 and 1952 from two nearby sites, and should be considered as very rare. Both collecting sites are located in an unprotected area more and more heavily populated and where the swamps are converted to farmland. Consequently, biodiversity sheltered by it, is losing its habitat and becomes severely threatened. Due to this loss of habitat, the species is experiencing a rapid continuing decline in area, extent and/or habitat quality, and AOO. This is especially serious as the species occurs at a single location. Therefore, based on the above observations, it is assessed as Critically Endangered (CR). The species has not been recollected after 1952, despite of several collecting activities in the area, and may well already have gone extinct, reason why the tag Possibly Extinct (PE) was added.

Bibliography – Fernandes & Fernandes (1960), Ntore & *al.* (2017a47).

◄ ***Dissotis longisepala*** – Flowering twig (A), part of stem (B), leaf lower surface (C), leaf upper surface (D), flower bud (E), flower (F), fruiting (G), sepal (H), tooth between calyx lobes (I), hypanthium appendages (J), outer whorl stamen (K), inner whorl stamen (L), petal (M), seed (N). Drawing by A. Diniz, Jardim Botânico da Universidade de Coimbra (©), reproduced with permission from Fernandes & Fernandes (1960).

Dissotis pterocaulos Wickens

Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(ii,iii).

Description – A shrub to 1.2 m high; stem and branches 4-winged upwards (wing to 2 mm wide); inflorescence terminal with solitary flowers or with 3 to 5 flowers in a cyme; calyx tube 8–9 mm long, densely silvery hairy; corolla purple, up to 3.5 cm long.

Habitat – It occurs in grassland and swamps, at ± 1800–2200 m altitude.

Vernacular names – Ishonge, umunyamende (in kirundi).

Seed dispersal – Limited, probably by dry capsules, opening and releasing numerous seeds (autochory).

Distribution – Known from south-eastern and western Burundi, western Rwanda as well as western Tanzania.

Red List parameters – EOO: 6,840 km^2; AOO: 90 km^2; Number of locations: 5.

Justification – The extent of occurrence (EOO) and area of occupancy (AOO) both fall within the limits for the Vulnerable category under sub-criteria B1 and B2. The species has been collected 10 times between 1952 and 1981 and might be considered as fairly rare. Unfortunately, only one of the known collecting localities is situated in a protected area, the

◄ ***Dissotis pterocaulos*** – Flowering twig (A), part of stem (B), leaf, lower surface (C), idem, indumentum (D), flower bud (E), calyx lobe (F), petal (G), stamen, outer whorl (H), stamen, inner whorl (I), appendage between calyx lobes (J), appendage, upper part of hypanthium (K), idem, lower part of hypanthium (L, M, N). Drawing by M.E. Church, Royal Botanic Gardens, Kew (©), reproduced with permission from Wickens (1974).

Kibira National Park in Burundi. The others occur outside protected areas, and are under tremendous pressure of human population growth. Grassland and swamp habitats are being degraded or lost through conversion for agricultural and pastoral uses. This pressure leads us to infer a continuous decline in area, extent and/or quality of habitat, and thus, also of its AOO. Regarding these threats, the number of locations is set at 5. Therefore, based on the above observations, the species is listed as Endangered (EN).

Bibliography – Bizimana (1994), Ntore & *al.* (2017a48), Wickens (1974, 1975).

Menispermaceae

Tinospora orophila Troupin

Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(iii).

Description – A twining woody liana; leaves alternate, glabrous, coriaceous or papery, lamina broadly ovate to suborbicular, 4–7 × 2.5–6 cm, acuminate at apex, cordate or obtuse

at base; inflorescences cymose, raceme-like, axillary, staminate ("male") and carpellate ("female") inflorescences present; flowers brownish-purplish, up to 0.5 cm long, staminate and carpellate flowers similar; fruit a rounded drupe of up to 2 × 1.5 cm.

Habitat – It is found in the under-storey of montane rain forest, often near streams, at 1650 2200 m altitude.

Seed dispersal – Efficient, by means of the fruits being eaten and secreted by birds (endoornithochory).

Distribution – Endemic to the Albertine Rift, only known from near the Kibira Forest in north-western Burundi, and from the Nyungwe Forest in south-western Rwanda.

Red List parameters – EOO: not applicable; AOO: 18 km^2; Number of locations: 2.

Justification – With only two collecting sites where the species has been observed, it is not possible to calculate an extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits of the Critically Endangered category under sub-criterion B2. This species is known from only three herbarium specimens collected between 1969 and 1980 and can be considered as very rare. The two collecting sites lie inside protected areas (the Nyungwe National Park in Rwanda and the Kibira National Park in Burundi). However, the collecting site from Burundi is close to the border of the Park where the forest edge suffers from wood clearing operations, and gold mining activities. As the forest wherein it inhabits is being degraded, the habitat quality of the species is likely to be declining. Considering this habitat loss, the species occurs at 2 locations. Therefore, based on the above information, it is assessed as Endangered (EN).

Bibliography Fischer & Killmann (2008), Ntore & *al.* (2017a49), Troupin & Lambinon (1977).

► ***Tinospora orophila*** – Photos by Eberhard Fischer (©) taken at Karamba (flower) and at Pindura-Bweyeye (fruits), Rwanda.

Embelia libeniana Taton

Red List category – **Vulnerable (VU)**.

IUCN criteria – B1ab(i,ii,iii,iv,v)+B2ab(i,ii,iii,iv,v).

Description – A liana of up to 10 m tall; bark striate, with prominent lenticels; leaves alternate, along the branches or in clusters at the end of branches, lamina obovate-oblong to rhombic, 2.5–7 × 1.3–3.6 cm, apex rounded to acute, chartaceous or coriaceous, with visible gland dots, glabrous to pubescent, discolourous; inflorescence a dense axillary raceme, 0.8–2 cm long, with 3 to 10 flowers; flowers greenish to white, up to 3.4 mm long; fruit a globose drupe, 0.5 cm in diameter.

► ***Embelia libeniana*** – Photo by Eberhard Fischer (©) taken at Mount Bigugu, Rwanda.

Vernacular name – Umukarakara (in kirundi).

Habitat – It occurs in upland forests, at 2000–2450 m altitude.

Seed dispersal – Effective, by fruits eaten by birds (endozoochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, western Rwanda, and eastern Democratic Republic of the Congo.

Red List parameters – EOO: 8,525 km²; AOO: 171 km²; Number of locations: 7.

Justification – The extent of occurrence (EOO) falls within the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for

the Endangered category under sub-criterion B2. The species is currently known from 26 herbarium specimens collected between 1967 and 1984, and could be considered as moderately common. Many of the known collecting localities lie within protected areas (the Kibira National Park in Burundi and the Nyungwe National Park and the Gishwati-Mukura National Park in Rwanda), where the upland forests are safe. The other sites are located outside protected areas, where relic forests fragments are being degraded due to increasing human activities such as cattle grazing, mining, wood harvesting, etc. Thus, many plant species associated with this habitat, including the species concerned here, are facing a threat increasing at alarming rate. This leads us to estimate the number of locations at 7 and to infer a continuing decline in the AOO, EOO, extent of the habitat, number of subpopulations and number of mature individuals. Based on the above observations, the species is listed as Vulnerable (VU).

Note – The species is classified by APG IV within the family Primulaceae.

Bibliography – Angiosperm Phylogeny Group (2016), Fischer & Killmann (2008), Habiyaremye & Nzigidahera (2006), Ntore & *al.* (2017a50), Taton (1980a, 1980b).

Passifloraceae

Adenia lewallei A.Robyns

Red List category – **Critically Endangered (CR)**.

IUCN criteria – B2ab(iii).

Description – A climber with stems of up to 6 m long; leaves 3-palmatifid; male inflorescence with 1 or 2 flowers; male flowers ± 20 × 14 mm; corona with deflexed laciniate rim; petals with up to 5 mm long hairs along the margin; female flowers unknown.

Habitat – The species occurs in forest fringes, at 1650–1750 m altitude.

Seed dispersal – Effective, most likely by animals eating the fruit and seeds passing the gut (endozoochory).

Distribution – Only known from the Bururi Forestry Natural Reserve, in south-western Burundi.

Red List parameters – EOO: not applicable; AOO: 9 km²; Number of locations: 1.

Justification – With only two collecting sites where the species has been observed, it is not possible to calculate its extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits of the Critically Endangered category under sub-criterion B2. This species is known from only two herbarium specimens, both collected in 1969 and close to each other, in a well-collected area and should be considered as very rare. The population occurs at the edge of the Bururi Forestry Natural Reserve where it is not secure. The collecting locality is subject to threat from human encroachment on the edge of the Reserve, like deliberate fires, livestock grazing, and wild shrubs harvesting for cooking fire. These activities result in a

decline in quality of habitat for the species. Therefore, based on the above, the species has been assessed as Critically Endangered.

BIBLIOGRAPHY – Kakunze (2015), Luke & *al.* (in press), Robyns (198, 1995).

◄ ***Adenia lewallei*** – Flowering branch (A), leaf base, lower side (B), male flower, longitudinal section (C), petal (D). Drawing by Antonio Fernandez, Botanic Garden Meise (C).

Phyllanthaceae

Phyllanthus burundiensis Jean F.Brunel

RED LIST CATEGORY – **Critically Endangered (Possibly Extinct) (CR (PE))**

IUCN CRITERIA – B2ab(iii,iv).

DESCRIPTION – A prostrate herb with small branches, similar to *P. gagnepainii* Jean F.Brunel & Roux; leaves ovate, staminate ("male") flowers small; carpellate ("female") flowers with

1.6–2.2 mm long pedicel; calyx lobe veins 0.15–0.25 mm wide; seeds with 10 to 12 costulate lines.

Habitat – It occurs in palm grove savannah, at 800 m altitude.

Seeds dispersal – Limited, by means of endozoochory.

Distribution – Only known from the Rusizi Plain in western Burundi.

Red List parameters – EOO: not applicable; AOO: 9 km^2; Number of locations: 1.

► ***Phyllanthus burundiensis*** – Scan of the holotype specimen (Reekmans 2555) at BR; cataphylls (A), leaf (B), female flower (ovary suppressed) (C), male flower (D). Drawing by Jean Frédéric Brunel (©), reproduced from Brunel (1987).

Justification – With only a single collecting site it is not possible to calculate an extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. This species is only known from the type specimen collected in 1973, and is considered to be very rare. The collecting area is situated in a non-protected area that has been badly impacted by man. Indeed, the woodland and the palm grove savannah habitat has been lost and degraded through conversion of land for crop growing like an industrial sugar cane plantation, for livestock grazing, and for expanding human settlements. The ongoing loss of habitat leads us to infer a continuing decline in the number of mature individuals which occur in a single known location. Hence, based on the above observations, the species is listed as Critically Endangered (CR). Because of the high

potential of the species actually being already extinct, it is flagged with Possibly Extinct (PE). Further research on the species is required.

BIBLIOGRAPHY – Brunel (1987), Ntore & *al.* (2017a56).

Pittosporaceae

Pittosporum mildbraedii Engl.

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B1ab(iii)+2ab(iii).

DESCRIPTION – A shrub or tree of up to 8 m high; inflorescence in clustered racemes; flowers yellowish; seeds bright red, sticky.

HABITAT – Montane forests, at 2500–3500 m altitude.

SEED DISPERSAL – Effective, by birds who eat the fruit and then excrete the seeds (endozoochory).

DISTRIBUTION – Endemic to the Albertine Rift, occurring in western Burundi, western Rwanda and eastern Democratic Republic of the Congo.

◄ ***Pittosporum mildbraedii*** – Photos by Eberhard Fischer (©) taken at Mount Sabyinyo, Rwanda.

Red List parameters – EOO: 8,267 km², EOO: 45 km²; Number of locations: 5.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the Endangered category under sub-criteria B1 and B2. The species is known from 8 herbarium specimens collected between 1934 and 1999. Three collecting localities fall inside protected areas (the Gishwati-Mukura National Park and Volcanoes National Park in Rwanda, the Kibira National Park in Burundi). The Nshili-Munini collecting site is located just outside the Nyungwe National Park, and is not densely inhabited but has tea plantations. The two other ones lie outside protected areas, where the rare remnant forest patches are cleared for fire wood harvesting. As a consequence of this loss of biota associated with the forest, we conclude the species faces a decline. The various threats lead to the estimation of 5 locations for this species and to infer a decline in quality of habitat. Therefore, based on the above information, it has been listed as Endangered (EN).

Bibliography – Engler (1909), Léonard (1951).

Rubiaceae

Ixora burundiensis Bridson

Red List category – **Vulnerable (VU).**

IUCN criteria – B2ab(iii).

Description – A shrub or small tree of 4.5–16 m tall; stipules truncate, withs sheaths 2.5–5(–6) mm long; leaves coriaceous, lamina oblanceolate to narrowly obovate, 6.5–17.5 × 2.3–5.6 cm, glabrous; inflorescence with numerous flowers in a terminal cymose panicle; flowers fragrant, white, corolla with tube of 3.6–5.8 cm × 1–2 mm, with 4 triangular lobes of 7–8 mm long; fruit a fleshy drupe, 9–11 mm in diameter.

Vernacular names – Ikinesha, ingoramure, umugote, umuhotora (in kinyarwanda).

Habitat – It grows in montane rainforest and dry woodland, at 1650–2400 m altitude.

Seed dispersal – Effective, probably by animals eating the fruits (endozoochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, western Rwanda, eastern Democratic Republic of the Congo and western Tanzania.

Red List parameters – EOO: 86,166 km²; AOO: 171 km²; Number of locations: 7.

Justification – The extent of occurrence (EOO) is far exceeding the 20,000 km² upper limit for the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species was collected 29 times between 1947 and 2014, and might be considered as relatively abundant. Four of its known collecting sites lie within protected areas (the Nyungwe National Park in Rwanda, the Bururi Forestry Nature Reserve in Burundi, the Kahuzi-Biega National Park in the Democratic Republic of the Congo and the Mahale Mountains National Park in Tanzania) where the habitat is safe. The species is likely to be present within the Kibira National Park in north-western Bu-

rundi because it used to be collected twice close to the park borders. The other collecting sites are located outside protected areas where the human pressure, including clearing and wood harvesting, is severely degrading the forests. As a consequence, habitat loss plays an important role in the decline of biota associated with it, including those of this species. These threats lead us to estimate the number of locations at 7 and to infer a continuing decline in habitat quality. Therefore, based on the above information, the species has been assessed as Vulnerable (VU).

Bibliography – Bridson & Troupin (1985), De Block (1998), Fischer & Killman (2008), Ntore & *al.* (2017a58).

► ***Ixora burundiensis*** – Photo by Eberhard Fischer (©) taken at the Kamiranzovu Swamp, Rwanda.

Keetia angustifolia Bridson

Red List category – **Least Concern (Conservation Dependent) (LC (CD))**.

Description – A climbing shrub of 2.5–20 m tall; leaves elliptic-lanceolate, flowers 4–5-merous, in pedunculate axillary cymes; corolla cream to pale yellow; fruit a subspherical drupe, ± bilobate, with a flattened ovoid pyrene.

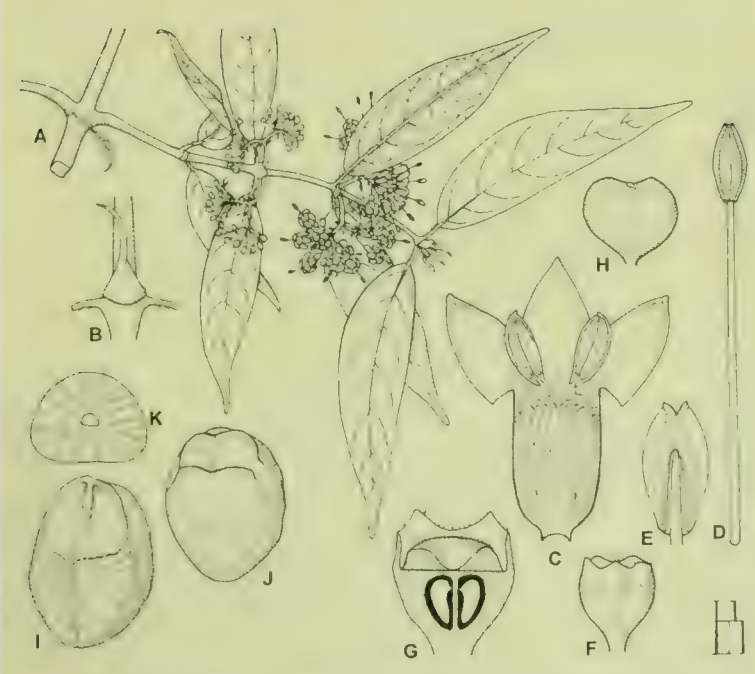
Habitat – It occurs in montane forest, at 1800–2450 m altitude.

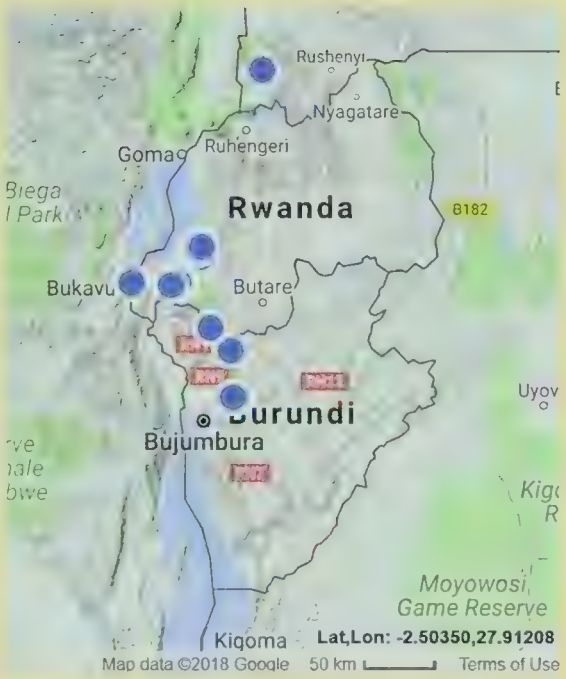
Seed dispersal – Effective, by fruits eaten by birds (endozoochory).

Distribution – Endemic to the Albertine Rift, occurring in north-western Burundi, south-western Rwanda and south-western Uganda.

Red List parameters – EOO: 9,500 km², AOO: 108 km², Number of locations: not applicable.

Justification – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1, whereas the area of occupancy (AOO) falls within the





Keetia angustifolia Flowering branch (A), stipule (B), corolla, longitudinal section (C), style (D), stigma, longitudinal section (E), calyx and hypanthium (F), idem, longitudinal section (G), fruit (H), pyrene (J), seed (K), idem, transverse section (L). Drawing by Diane M. Bridson, Royal Botanic Gardens, Kew (©), reproduced with permission from Bridson (1986).

thresholds for the Endangered category under sub-criterion B2. The species is represented in herbaria by 23 specimens collected between 1956 and 1999 and should be considered as moderately rare. Fortunately, all collecting sites are situated in well protected areas (the Kibira National Park in Burundi, the Nyungwe National Park in Rwanda and the Bwindi Impenetrable National Park in Uganda). For as long as the parks offer protection to the plant, populations of *K. angustifolia* are likely to be relatively secure and stable. Thus, since the conditions required under sub-criterion B2 are not met, the species cannot be assessed into any threat category. Therefore, based on the above observations, it has been assessed as Least Concern (LC), but because its entire occurrence is within protected areas, the label Conservation Dependent has been added (CD).

Bibliography – Bridson (1986), Verdcourt & Bridson (1991).

Otiophora lebruniana (Bamps) Robbr. & Puff

Red List category – **Vulnerable (VU)**.

IUCN criteria – B2ab(iii).

Synonyms – *Mericocalyx lebruniamus* Bamps.

Description – A perennial herb or subshrub of 20–30 cm tall; leaves opposite or pseudoverticillate; inflorescence a lax to capitate spike; calyx with incomplete tube, reduced to a single leaf-like lobe; corolla white to white-pinkish, with a 4–5 mm long tube and 4–5 lobes.

Habitat – It occurs in Ericaceae grassland and different types of grass savannahs, between 1400 and 2600 m altitude.

◄ ***Otiophora lebruniana*** – Photo by Eberhard Fischer (©) taken at Bururi, Burundi.

Seed dispersal – Limited, fruit dehiscing into two mericarps and seeds falling freely to the ground (autochory).

Distribution – Distributed in Burundi and eastern Democratic Republic of the Congo.

Red List parameters – EOO: 59,554 km^2; AOO: 252 km^2; Number of locations: 7.

Justification – The extent of occurrence (EOO) exceeds the upper limits for the Vulnerable category under sub-criterion B1, whereas its area of occupancy falls within the limits for the Endangered category under sub-criterion B2. This species is known from 45 herbarium specimens recorded between 1950 and 1982 and might be considered as common. Many of the known localities occur in protected areas (the Bururi Forest Nature Reserve and the Kibira National Park in Burundi), where the habitat should be safe. Several others occur outside of protected areas where the grassland habitat is being lost degraded due especially to livestock farming and the planting of alien timber species. As a result, the habitat loss/degradation plays a significant role in the degradation of the biota associated with it, including those of this species. This threat leads us to estimate the number of locations for this species at 7 and to infer a continuing decline in habitat quality. Therefore, based on the above observations, the species is listed Vulnerable (VU).

Bibliography – Ntore & *al.* (2017a59), Puff (1981).

Otiophora lebruniana (Bamps) Robbr. & Puff var. *devrediana* (Bamps) Robbr. & Puff

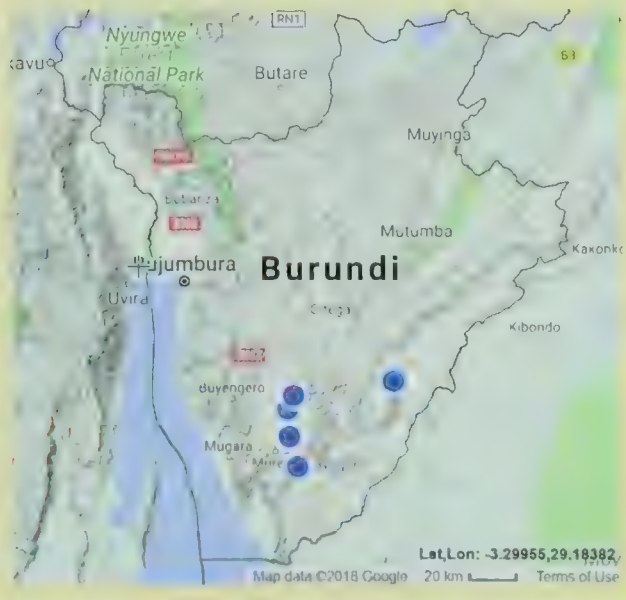
RED LIST CATEGORY – **Endangered (EN).**

IUCN CRITERIA – B1ab(iii)+B2ab(iii).

SYNONYMS – *Mericocalyx devredianus* Bamps.

DESCRIPTION – A perennial erect herb of 20 cm tall; stems ± 1 mm in diameter; leaves pubescent on both surfaces; inflorescence dense, capitate.

◄ ***Otiophora lebruniana* var. *devrediana*** – Scan of the isotype specimen (Michel 4665) at BR.



HABITAT – The species occurs in various types of grassland, including grassland with Ericaceae, at 1800–2200 m altitude.

SEED DISPERSAL – Limited, fruit dehiscing into two mericarps and seeds falling freely to the ground (autochory).

DISTRIBUTION – Only known from southern and south-eastern Burundi.

RED LIST PARAMETERS – EOO: 768 km²; AOO: 54 km²; Number of locations: 2.

JUSTIFICATION – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits for the Endangered category (EN) under sub-criteria B1 and B2. This variety is known from 7 herbarium specimens, recorded between 1955 and 1974, and can thus be considered as rare. None of the known collecting localities occur within a

protected area. They are situated on mountain summits where they are adversely affected by increasing human activities such as livestock farming and the establishment of timber plantations with exotic trees. As a consequence, this habitat loss plays a significant role in the degradation of biota associated with it, including those of this species. It leads to an estimation of the number of locations of 2 and to infer a decline in extent and quality of habitat. Hence, based on the above observations, this variety is listed as Endangered (EN).

Bibliography – Bamps (1959), Ntore & *al.* (2017a60), Robbrecht (1981).

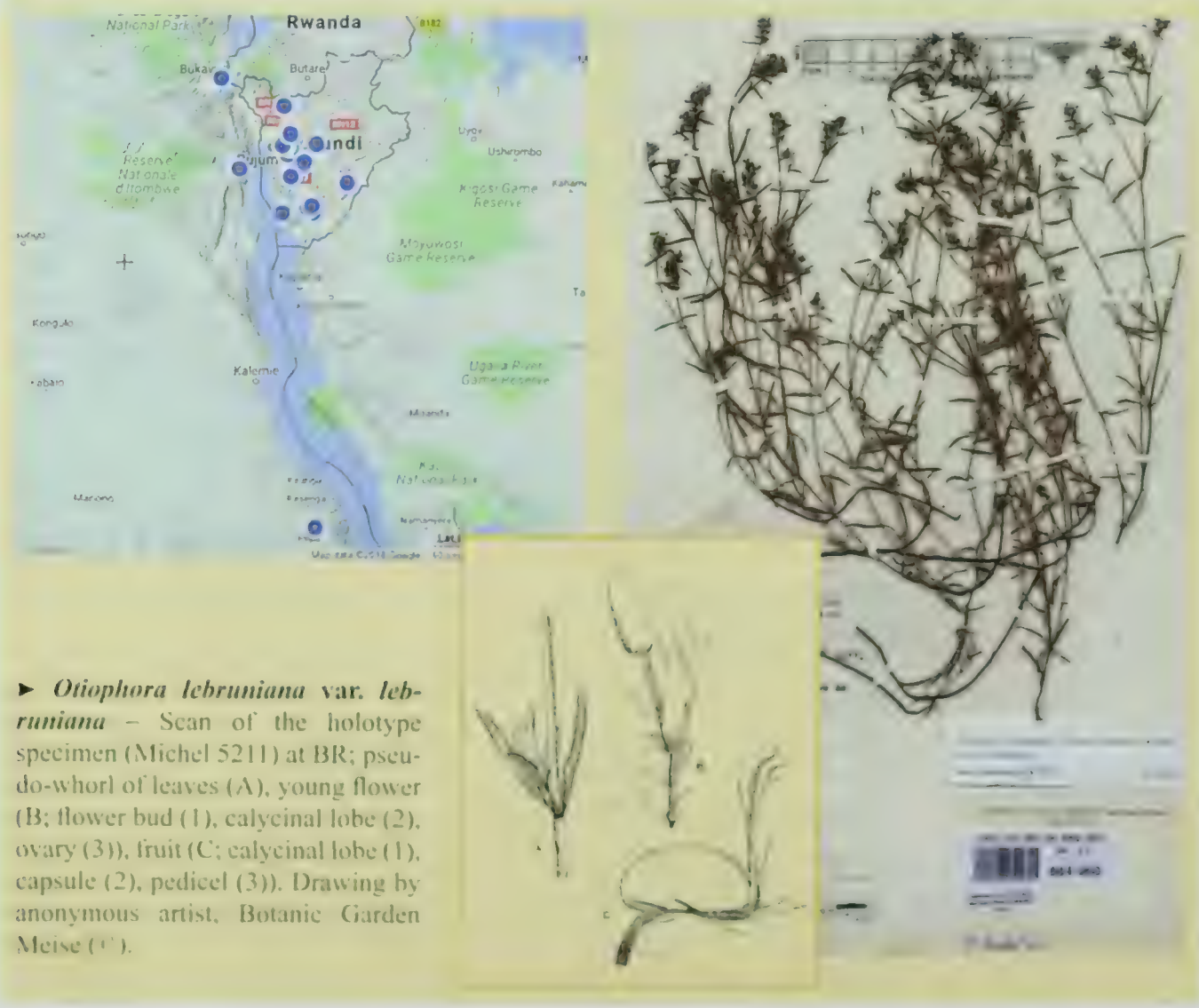
Otiophora lebruniana (Bamps) Robbr. & Puff var. ***lebruniana***

Red List category – **Vulnerable (VU).**

IUCN criteria – B2ab(iii).

Synonyms – *Mericocalyx lebrunianus* Bamps.

Description A perennial herb; stems ± 0.6 mm in diameter; leaves entirely glabrous; inflorescence lax, elongate.



► ***Otiophora lebruniana*** **var. *lebruniana*** – Scan of the holotype specimen (Michel 5211) at BR; pseudo-whorl of leaves (A), young flower (B; flower bud (1), calycinal lobe (2), ovary (3)), fruit (C; calycinal lobe (1), capsule (2), pedicel (3)). Drawing by anonymous artist, Botanic Garden Meise (©).

Habitat – It occurs in various types of savannah, among which those with a dominance of *Loudetia*, and in grassland with Ericaceae, at 1400–2600 m altitude.

Seed dispersal – Limited, fruit dehiscing into two mericarps and seeds falling freely to the ground (autochory).

Distribution – Distributed in Burundi and eastern Democratic Republic of the Congo.

Red List parameters – EOO: 36,656 km^2; AOO: 207 km^2; Number of locations: 7.

Justification – The extent of occurrence (EOO) is larger than the 20,000 km^2 upper limit for the Vulnerable category under sub-criterion B1; whereas the area of occupancy (AOO) falls within the limits for the Endangered category (EN) under sub-criterion B2. This variety is known from 40 herbarium specimens recorded between 1950 and 1982 showing that it is moderately common. A few collecting sites are from inside a protected area (the Kibira National Park in Burundi) where the grassland habitat is still safe. The majority, however, lie outside protected areas on mountain summits where the savannah is suffering mainly from livestock farming and the establishment of timber plantations with exotic species. As a consequence, the habitat loss plays a key role in the degradation of biota associated with it, including those of this variety. It leads to an estimation of the number of locations of 7, and to infer a continuing decline in extent and quality of habitat. Hence, based on the above information, this variety is listed as Vulnerable (VU).

Bibliography – Bamps (1959), Ntore & *al.* (2017a61), Robbrecht & Puff (1981).

Otiophora rupicola Verdc.

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(iii,v)+2ab(iii,v).

Description – An erect, perennial dwarf shrub of up to 0.5 m tall; inflorescence a dense capitate spike; calyx with 1 or 2 leafy lobes of 6 × 1.2 mm and 3 or 4 filiform lobes of 2 mm long; corolla pink to malvaceous, tube 11 mm long, with 5 lobes.

Habitat – This species occurs in grassland on granite, on quartzite rocks and in rocky grasslands with short vegetation, at 1800–2515 m altitude.

Seed dispersal – Limited, fruit dehiscing into two mericarps and seeds falling freely to the ground (autochory).

Distribution – Endemic to the Congo-Nile Divide, occurring on Mount Manga, as well as in the Munini and Rwamunyinya hills, in western and southern Burundi.

Red List parameters – EOO: 144 km^2; AOO: 45 km^2; Number of locations: 2.

Justification – The extent of occurrence (EOO) falls in the limits of the Vulnerable category under sub-condition B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is known from 11 herbarium specimens collected between 1950 and 1978, and should be considered as fairly rare. All known collecting sites lie outside protected areas, on mountain peaks where the grassland is mainly threatened by increasing human activities like livestock farming and the establishment of alien tree plantations. This habitat loss degradation leads to an estimation of the number of locations

of 2 and to infer a continuing decline in extent and quality of habitat and in number of mature individuals. Based on the above observations, the species is assessed as Endangered (EN).

Bibliography – Ntore & *al.* (2017a62), Verdcourt (1971).

◄ ***Otiophora rupicola*** – Habit (A), base of pair of leaves showing stipules (B), leaf, cross section (C), flower bud (D), flower (E), corolla, opened (F), base of flower, cross section (G), stigma (H). Drawing by Maureen Church, Royal Botanic Gardens, Kew (©) reproduced with permission from Verdcourt (1971).

Oxyanthus troupinii Bridson

Red List category – **Vulnerable (VU).**

IUCN criteria – B1ab(i,ii,iii,iv,v)+B2ab(i,ii,iii,iv,v).

Description – A shrub or small tree of 1–12 m tall; stipules ovate to lanceolate, 1–2 × 0.4–0.7 cm, acute, often bifid at apex; leaf blade elliptic to oblanceolate, 6.2–14 × 2–6.1 cm, subcoriaceous; inflorescence with numerous flowers in a cymose panicle, flowers fragrant, corolla white, with funnel-shaped tube up to 2.2 cm long and 1–1.5 mm wide, with 5 triangular lobes of 7–9 mm long; fruit an elliptic to rounded berry, up to 3 cm long.

Vernacular names – Ingongo (in kinyarwanda).

Habitat – The species occurs in montane forest, at 1650–2450 m altitude.

Seed dispersal – Effective, by animals who eat fleshy fruits then excrete seeds (endozoochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, western Rwanda, eastern Democratic Republic of the Congo and south-western Uganda.

Red List parameters – EOO: 15,679 km^2; AOO: 180 km^2; Number of locations: 9.

Justification – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) is falls within the limits for the Endangered category under sub-criterion B2. It is known from 21 herbarium specimens, collected between 1935 and 2008, and may be considered as moderately common. Twelve collecting sites lie inside protected areas (the Kahuzi-Biega National Park in the Democratic Republic of the Congo, the Kibira National Park in Burundi, the Gishwati-Mukula National Park and the Nyungwe National Park in Rwanda and the Mafuga Forest Station in Uganda which lacks effective enforcement). Six other ones lie outside protected areas in small relic forest patches where they are severely affected by the ever-increasing demands for land of the fast growing human population. Important stretches of natural habitat are converted due to activities such as agriculture, livestock farming, firewood harvesting and mining. As a consequence, the habitat loss plays a key role in the degradation of biota associated to it, including those of this species. Those threats lead to an estimation of the number of locations of 9 and to presume an ongoing decline in EOO, AOO, extent and quality of habitat, number of locations, as well as number of mature individuals. Based on the above observations, the species is listed as Vulnerable (VU).

Bibliography – Bridson (1979), Fischer & Killmann (2008), Ntore & *al.* (2017a63), Verdcourt & Bridson (1991).

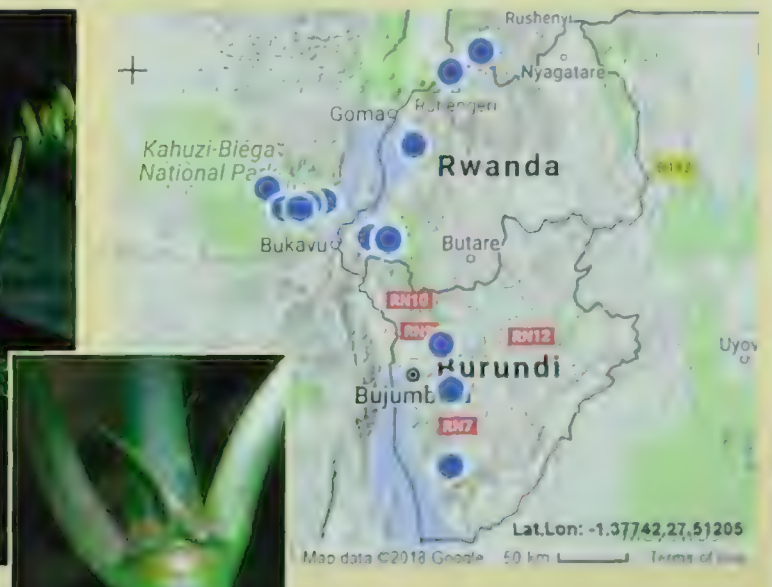
◄ ▲ ***Oxyanthus troupinii*** – Photos by Eberhard Fischer (©) taken at Mount Bigugu, Rwanda.

Pavetta pierlotii Bridson

RED LIST CATEGORY – **Vulnerable (VU)**.

IUCN CRITERIA – B2ab(ii,iii,v).

DESCRIPTION – A shrub of 1.7–4 m tall, glabrous; stipules truncate, 1.5–2.5 mm long; leaf blade elliptic to elliptic-oblong, 5.5–13 × 1.5–4.5 cm, coriaceous, glabrous above, hairy on the veins below; inflorescence with numerous flowers in a terminal dense cymose panicle; corolla creamy white to yellow, with tube up to 3 cm long and 4 lanceolate lobes of 8 mm long; style long-exserted; fruit a fleshy black drupe of 8 mm in diameter.



▲ ► ***Pavetta pierlotii*** – Photos by Eberhard Fischer (©) taken at Mount Bigugu, Rwanda.

HABITAT – It occurs in secondary forest and in disturbed, subalpine forest, at 1700–2270 m altitude.

SEED DISPERSAL – Effective, probably by animals who eat the fleshy fruits the excrete seeds (endozoochory).

DISTRIBUTION – Endemic to the Albertine Rift, occurring in western Burundi, south-western Rwanda, eastern Democratic Republic of the Congo and south-western Uganda.

RED LIST PARAMETERS – EOO: 22.328 km²; AOO: 126 km²; Number of locations: 8 or 9.

JUSTIFICATION – The extent of occurrence (EOO) slightly exceeds the limits for Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits of the Endangered category under sub-criterion B2. This species is known from 17 herbarium specimens, collected between 1935 and 2010, and should be considered as fairly rare. Most collecting sites are located within protected areas (the Kahuzi-Biega National Park in the Democratic Republic of the Congo, the Mpotsa Sacred Forest and the Kibira National Park in Burundi, the Gishwati-Mukura National Park and the Nyungwe National Park in Rwanda, the Mgahinga Gorilla National Park and the Echuya Forest Reserve in Uganda), where the species should be safe. The small remnant forest of Mpotsa is a venerated former necropolis of queen mothers which is bordered by a mosaic of cropland and pastures, but without any

official protection status, and is actually coveted by the surrounding farmers. A few sites lie outside protected areas, where the rare relic forest patches are suffering from habitat loss/ degradation through increasing human activities such as clearing, firewood harvesting and cattle grazing. This habitat loss plays a key role in the degradation of biota they shelter including those of this species. It leads to an estimation of the number of locations of 8 or 9, and also to infer a continuing decline in quality of habitat, number of mature individuals and AOO. Therefore, based on the above information, the species is listed as Vulnerable (VU).

Bibliography – Bridson (1980 & 2001), Fischer & Killmann (2008), Mwanga Mwanga & *al.* (2013), Ntore & *al.* (2017a64).

Pavetta rwandensis Bridson

Red List category – **Least Concern (Conservation Dependent) (LC (CD))**.

Description – A shrub or small tree of 1.8–5 m tall; stipules truncate, 2–3 cm long; leaf blade oblong to elliptic, 5.7–15.5 × 1–5.5 cm, coriaceous, with dense appressed hairs on both sides; inflorescence with numerous flowers in a terminal dense cymose panicle; corolla greenish-white, with tube of 1.3–1.5 cm and 4 lanceolate lobes of 8–9 mm long; style long-exserted fruit a fleshy black drupe, 0.7–1.3 cm in diameter.

◄ ***Pavetta rwandensis*** – Photo by Eberhard Fischer (©) taken at Uwinka, Rwanda.

Vernacular names – Akanyamabuye, injubati, umumenamabuye (in kinyarwanda).

Habitat – It occurs in thickets and montane forest, at 2000–2750 m altitude.

Seed dispersal – Effective, by the fleshy fruits eaten by animals (endozoochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi and south-western Rwanda as well as in eastern Democratic Republic of the Congo.

Red List parameters – EOO: 4,397 km^2; AOO: 90 km^2; Number of locations: not applicable.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits of the Endangered category under sub-criteria B1 and B2. The species is known from 11 herbarium specimens collected between 1959 and 1999 and should be considered as fairly rare. Luckily, all its known occurrences lie inside well protected areas (the Kahuzi-Biega National Park in the Democratic Republic of the Congo, the Kibira National Park in Burundi and the Nyungwe National Park in Rwanda), which means they are safe. Thus, since the species is believed to occur only in protected areas and therefore to experience no threat or decline, it cannot be assessed in any threat category. Hence, based on the above observations, the species is listed as Least Concern (LC), but because its entire occurrence is within protected areas, the label Conservation Dependent has been added (CD).

Bibliography – Bridson (1978), Bridson & Troupin (1982), Fischer & Killmann (2008), Ntore & *al.* (2017f9).

Pavetta troupinii Bridson

Red List category – **Least Concern (Conservation Dependent) (LC (CD))**.

Description – A shrub of 1.7 -3(–7?) m tall, glabrous; stipules truncate, ± 4 mm long; leaf blade elliptic to elliptic-oblong, 5.5–13 × 1.5–4.5 cm, coriaceous, glabrous, lateral veins almost perpendicular; inflorescence with numerous flowers in a terminal dense cymose panicle; corolla creamy white to yellow, tube 1.5-1.8 cm long, with 4 lanceolate lobes of 7 mm long; style long-exserted.

Habitat – It occurs in upland forest, at 1900–2750 m altitude.

Seed dispersal – Effective, by birds who eat the fleshy fruit then excrete seeds (endozoochory).

Distribution – Endemic to the Congo-Nile Divide, occurring in south-western Burundi and south-western Rwanda.

Pavetta troupinii – Flowering twig (A), stipule (B), calyx (C), corolla and style (D). Drawing by Diane M. Bridson, Royal Botanic Gardens, Kew (C) reproduced with permission from Bridson (1980).

Red List parameters – EOO: not applicable; AOO: 18 km^2; Number of locations: not applicable.

Justification - With only two collecting sites where the species has been observed, it is not possible to calculate an extent of occurrence (EOO). The area of occupancy (AOO) falls within the thresholds of the Endangered category under sub-criterion B2. It is known from only two herbarium specimens collected in 1976 and 2004 which shows it is very rare. Fortunately, the two sites are located inside protected areas (the Bururi Forest Nature Reserve in Burundi and the Nyungwe National Park in Rwanda) conserving habitats and providing a refuge this species. Thus, since no threat can be identified, the species is not thought to be in decline. As such, the species cannot be assessed in any threat category. Therefore, based on the above observations, it has been assessed as Least Concern (LC), but because its entire occurrence is within protected areas, the label Conservation Dependent has been added (CD).

Bibliography – Bridson (1980), Bridson & Troupin (1982).

Pavetta urundensis Bremek.

IUCN Red List – **Vulnerable (VU)**.

IUCN criteria – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

Description – A shrub or small tree of 2–5(–7) m tall; stipules truncate, keeled, keel extending as narrow-triangular lobe; leaf blade elliptic-oblong, papery, nerves puberulous with long white hairs below; inflorescence a cymose corymb that occurs terminal on main branches, compact to lax; corolla tube 5–9 mm long; fruit a black drupe of ± 7 mm in diameter.

Vernacular names – Ikigajagaja, ikinyabatwa, umumenabuye (in kinyarwanda); umunyamabuye (in kirundi).

Habitat – It occurs in montane forests, at 1850–2600 m altitude.

Seed dispersal – Effective, by birds who eat the fleshy fruit then exerete seeds (endozoochory).

Distribution – Near-endemic to the Albertine Rift, occurring in western Burundi, western (and north-eastern) Rwanda, eastern Democratic Republic of the Congo and south-western Uganda.

Red List parameters – EOO: 18,720 km^2; AOO: 207 km^2; Number of locations: 9.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits for the Endangered category (EN) under sub-criteria B1 and B2. This species is known from 32 herbarium specimens, collected between 1932 and 1999, and might be considered as moderately common. Most collecting sites occur inside protected areas (the Kibira National Park in western Burundi, the Nyungwe National Park and the Volcanoes National Park respectively in south-western and northern Rwanda, the Virunga National Park in eastern Democratic Republic of the Congo and the Bwindi Impenetrable National Park in south-eastern Uganda) where the species' habitat should be secured. Sadly, the Virunga National Park is now confronted with a severe potential threat from pursing plans for oil extraction. The other collecting sites lie outside protected areas where they are under serious pressure related to rapid human population growth causes a rising demand for natural resources including land for subsistence farming and fire wood. Consequently, by cutting

◄ ▲ ***Pavetta urundensis*** – Photos by Eberhard Fischer (©) taken at Mount Sabyinyo, Rwanda.

down the relic forests fragments to meet these needs, habitat is destroyed and the associated biota threatened. These threats leads us to estimate the number of locations for the species at 9 and to infer a continuing decline in EOO, AOO, quality of habitat, number of locations, and number of mature individuals. Therefore, based on the above information, the species has been assessed as Vulnerable (VU).

Bibliography – Anonymous (2017), Bremekamp (1934), Bridson & Troupin (1982), Ntore & *al.* (2017a65).

Psychotria lebrunii Cheek

Red List category – **Vulnerable (VU).**

IUCN criteria – B1ab(iii)+2ab(iii).

Synonyms – *Psychotria chalconeura* (K.Schum.) E.M.A.Petit var. *montana* E.M.A.Petit

Description – A shrub of up to 2 m tall; leaf blade chartaceous, with broad, pit-like sparsely hairy domatia; corolla dirty yellow.

Habitat – It occurs in montane forests, gallery forests, dense forests, rainforest and marshland, at 1650–2700 m altitude.

Seed dispersal – Effective, by birds who eat the fleshy fruit then excrete seeds (endozoochory).

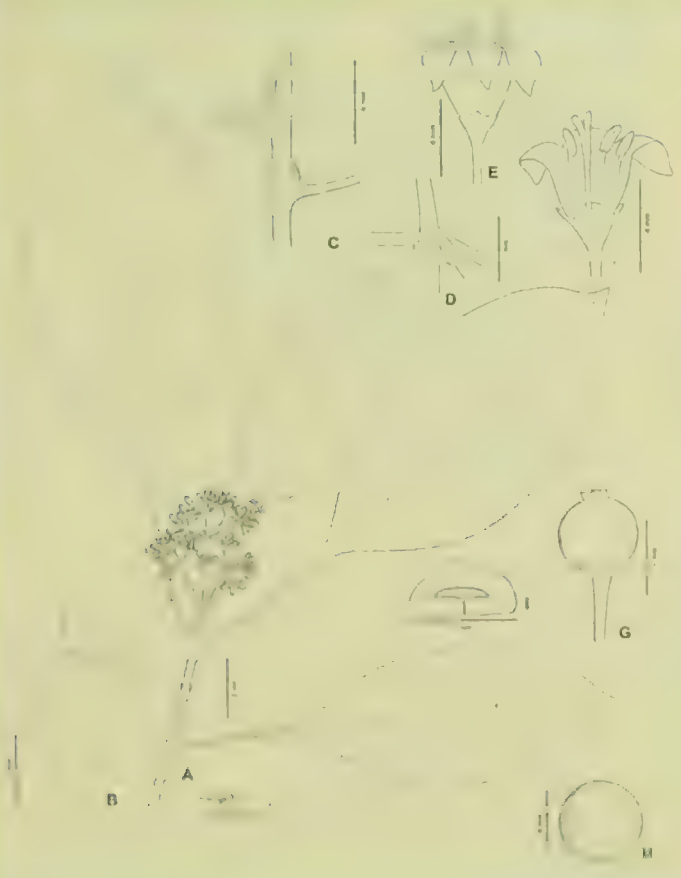
Distribution – Endemic to the Albertine Rift, occurring in western Burundi, eastern Democratic Republic of the Congo and south-western Rwanda.

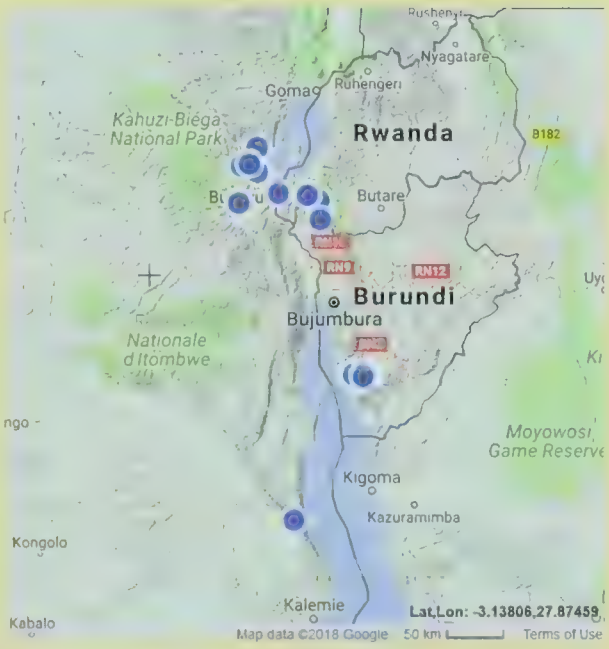
Red List parameters – EOO: 19,978 km²; AOO: 117 km²; Number of locations: 6.

Justification – The extent of occurrence (EOO) falls just within the limits for the Vulnerable category under sub-condition B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is known from 18 herbarium specimens, collected between 1932 and 2014, and might be considered as moderately abundant. Most collecting sites lie within protected areas (the Bururi Forest Nature Reserve

in southern Burundi, the Kahuzi-Biega National Park in eastern Democratic Republic of the Congo and the Nyungwe National Park in south-western Rwanda), where the species' habitat is secured. Others lie outside protected areas where human population is rapidly expanding, putting pressure upon the remaining forest patches through clearing, gold mining, conversion of forested areas to agriculture, and harvesting of fuel wood. As a consequence, the species' habitat in these regions is rapidly degrading. This leads us to estimate the number of locations at 6, and to infer a continuing decline in quality of habitat. Hence, based on the above information, the species has been be assessed as Vulnerable (VU).

Bibliography – Cheek & Csiba (2002), Ntore & *al.* (2017a66).





◄ ***Psychotria lebrunii*** – Flowering twig (A), stipules (B), domatia (C), detail of inflorescence (D), short-styled flower (E), long-styled flower in cross section (F), fruit (G), nut, dorsal view (H), seed, transverse secion (I). Drawing by Olivier Lachenaud (©), Botanic Garden Meise.

Psydrax parviflora subsp. ***melanophengos*** (Bullock) Bridson

Red List category – **Least Concern (Conservation Dependent) (LC (CD)).**

Synonyms – *Canthium melanophengos* Bullock.

Description – An evergreen tree; stipules 6–7 mm long, with triangular base and terminating in a lobe; leaf blade glabrous, but domatia pubescent; inflorescence pedunculate, branched; corolla tube with a ring of deflexed hairs inside; disk pubescent; fruit broader than long, pyrene strongly curved.

Habitat – It occurs in montane forests, at 2280–2450 m.

Seed dispersal – Effective, by birds who eat fruits then excrete seeds (endozoochory).

Distribution – Endemic to the Congo-Nile Divide, occurring in western Burundi and south-western Rwanda.

RED LIST PARAMETERS – EOO: 872 km^2; AOO: 45 km^2; Number of locations: 6.

JUSTIFICATION – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits for the Endangered category under sub-criteria B1 and B2. The species is represented in herbaria by 7 specimens, collected between 1959 and 1980, and can be considered as rare. All collecting sites fall within protected areas (the Kibira National Park in Burundi and the Nyungwe National Park in Rwanda). As long as these protected areas remain well-managed, the conservation of the plants they shelter is not an immediate concern. Because no decline can be assumed, the subspecies cannot be assessed into any threat category. Therefore, based on the above information, it has been assessed as Least Concern (LC), but because its entire occurrence is within protected areas, the label Conservation Dependent has been added (CD).

► ***Psydrax parviflora* subsp. *melanophengos*** – Flowering branch (A), stipule (B), flower (C), infrutescence (D), fruit (E). Drawing by D. Troupin (©), reproduced with permission from Troupin (1982).

NOTE – The species comprises four subspecies, as a whole has a wide distribution throughout tropical Africa and has been assessed as Least Concern (LC).

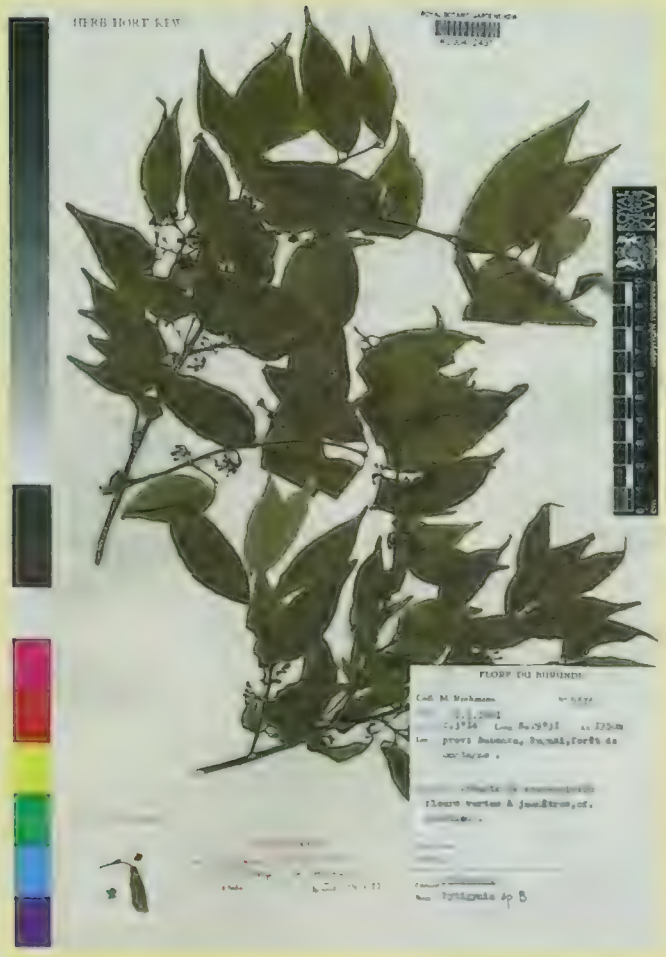
BIBLIOGRAPHY – Bridson & Troupin (1985).

Rytigynia acuminatissima (K.Schum.) Robyns subsp. *pedunculata* Verdc.

RED LIST CATEGORY – **Critically Endangered (CR)**.

IUCN CRITERIA – B2ab(iii,v).

DESCRIPTION – A shrub of up to 4 m tall; peduncle 5–10 mm long (distinctly longer than in subsp. *acuminatissima*); leaf blade with distinct reticulate veins below; calyx lobes denticulate; corolla greenish or yellowish.



◄ ***Rytigynia acuminatissima* subsp. *pedunculata*** - Scan of the isotype specimen (Reekmans 9816) at BR.

HABITAT The subspecies occurs in the undergrowth of montane forests, at 1950 m altitude.

SEED DISPERSAL Effective, probably by birds who eat fruits then excrete seeds (endozoochory).

DISTRIBUTION Endemic to the Congo-Nile Divide, occurring in western Burundi.

RED LIST PARAMETERS EOO: not applicable; AOO: 9 km^2; Number of locations: 1.

JUSTIFICATION With only one collecting site, it is not possible to calculate its extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits of the Critically Endangered category under sub-criterion B2. The subspecies is known from only two herbarium specimens collected in 1981, and it should be considered as very rare. The collecting site is situated outside any protected area, and is under great threat of montane forest habitat loss which is the result of increasing human population pressure on the environment. Human activities include mainly deforestation and livestock farming. The habitat loss degradation probably results in a decline of the subspecies, and leads us to infer a continuing decline in the number of mature individuals of the subspecies. Based on the above observations, it is listed as Critically Endangered (CR).

NOTE The species has two subspecies: subsp. *acuminatissima* is widely distributed in central and east Africa, in Burundi, Rwanda, Kenya, Tanzania and Uganda, and is considered as Least Concern (LC).

BIBLIOGRAPHY – Ntore & *al.* (2017a67), Verdcourt (1987).

Rytigynia bagshawei (S.Moore) Robyns

RED LIST CATEGORY – **Vulnerable (VU).**

IUCN CRITERIA – B2ab(i,ii,iii,iv,v).

SYNONYMS – *Vangueria bagshawei* S.Moore, *Vangueria bequaertii* De Wild.

DESCRIPTION – A shrub or small tree of 2 -8 m tall, with glabrous or hairy twigs; stipules with ± succulent appendix, 4–8 mm long; calyx with small pubescent teeth or glabrous; corolla lobes with subulate appendix of 2 mm long, the tube 3 -4 mm long, hairy at apex.

◄ ***Rytigynia bagshawei*** – Scan of the holotype specimen (Bequaert 4236) of *Vangueria bequaertii* at BR.

HABITAT – The species occurs in mountain forest; at 1900–2100 m altitude.

SEED DISPERSAL – Effective, by birds who eat the fruit then excrete seeds (endozoochory).

DISTRIBUTION – Known from western Burundi, western Rwanda, eastern Democratic Republic of the Congo and Tanzania.

RED LIST PARAMETERS – EOO: 293.541 km²; AOO: 99 km²; Number of locations: 7.

JUSTIFICATION – The extent of occurrence (EOO) exceeds the upper limits of the Vulnerable category under sub-criterion B1, whereas the area of occupancy (AOO) falls within the limits of the Endangered category under sub-criterion B2. The species is represented in herbaria by 14 specimens collected between 1914 and 2001 and should be considered as fairly rare. Three out the 14 collecting sites fall within protected areas (the Nyungwe National Park in Rwanda, the Kahuzi-Biega and the Virunga National Park in the Democratic Republic of the Congo), although the Virunga National Park is now confronted with a severe threat from pursing plans for oil extraction. The remaining sites lie outside protected areas where they are

under threats related to increasing human activities. These activities include wood harvesting and clearing of and are responsible for the degradation of habitat, including the one in which this species occurs. These threats lead us to estimate the number of locations at 7, and to infer a decline in the quality of habitat, number of mature individuals, and consequently in EOO, AOO, and number of locations. Based on the above information, the species is assessed as Vulnerable (VU).

NOTE – This species comprises two varieties: var. *bagshawei*, occurring in eastern Tanzania, and var. *lebrunii* (Robyns) Verdc., occurring in the Democratic Republic of the Congo, Rwanda and Burundi. The latter is treated below.

BIBLIOGRAPHY – Anonymous (2017), Moore (1907), Robyns (1928), Verdcourt & Bridson (1991).

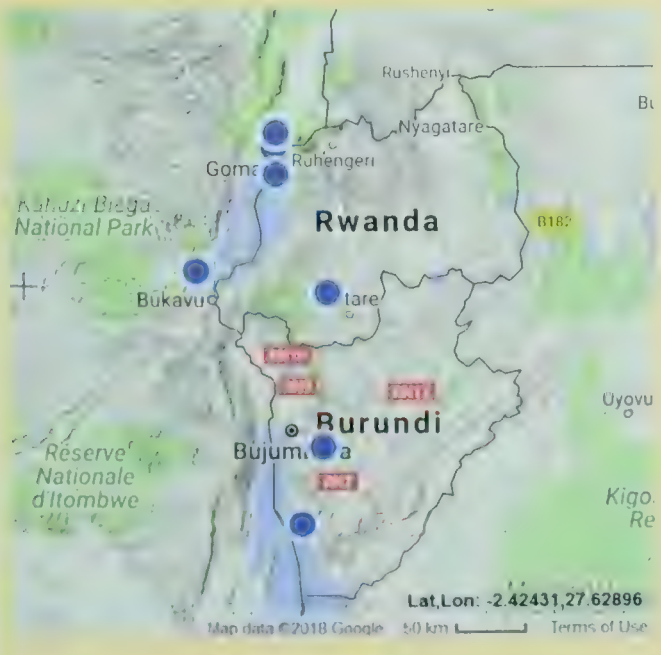
Rytigynia bagshawei (S.Moore) Robyns var. ***lebrunii*** (Robyns) Verdc.

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B2ab(i,ii,iii).

SYNONYMS – *Rytigynia lebrunii* Robyns.

DESCRIPTION Differs from the typical variety by having glabrous twigs and a glabrous calyx.



► ***Rytigynia bagshawei* var. *lebrunii*** – Flowering twig (A), flower (B). Drawing by Dominic Troupin (†), *reproduced with permission from* Bridson & Troupin (1982).

HABITAT – It occurs in the understorey of evergreen montane forest, at 1950–2700 m altitude.

SEED DISPERSAL – Effective, probably by birds who eat the fleshy fruit then excrete seeds (endozoochory).

Distribution - Endemic to the Congo-Nile Divide, occurring in eastern Democratic Republic of the Congo, south-western Rwanda and western Burundi.

Red List parameters – EOO: 14,114 km^2; AOO: 63 km^2; Number of locations: 5.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) fall within the Endangered category under sub-criteria B1 and B2. This species is known from 9 herbarium specimens, recorded between 1931 and 1988, and might be considered as moderately rare. Three collecting localities are situated within protected areas (the Nyungwe National Park in Rwanda and the Virunga National Park in the Democratic Republic of the Congo), where they are safe, although the Virunga National Park is now confronted with a severe threat from pursing plans for oil extraction. The other sites fall outside protected areas where they are facing a loss or degradation of forest habitat due to human population expansion. These adverse activities include deforestation for agriculture, cattle grazing and fire wood harvesting. It plays a key role in the loss of biodiversity, and is thought to affect the variety. These threats lead us to estimate its number of locations at 5, and to infer a continuing decline in habitat quality, EOO and AOO. Therefore, the variety has been listed as Endangered (EN).

Bibliography - Anonymous (2017), Ntore & *al.* (2017a68), Robyns (1943), Verdcourt (1985).

Rytigynia bridsoniae Verdc.

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

Description – A shrub to small tree of 2–5 m tall; leaf blade glabrous or very sparsely hairy, dark green, veins on lower surface indistinct; inflorescence with 2 or 3 flowers; corolla lobes with appendix of 1–1.5 mm long; style 4 mm long.

Vernacular names – Umusharara, urubarara, urusarabatemye (in kinyarwanda).

Habitat – It occurs in the understorey of evergreen montane forest, at 1650–3000 altitude.

Seed dispersal – Effective, probably by birds who eat the fleshy fruit then excrete seeds (endozoochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, western Rwanda, eastern Democratic Republic of the Congo and south-western Uganda.

Red List parameters – EOO: 25,921 km^2; AOO: 324 km^2; Number of locations: 10.

Justification – The extent of occurrence (EOO) exceeds the upper limits of the Vulnerable category under sub-criterion B1,

while the area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. This species is known from 57 herbarium specimens from 27 sites recorded between 1947 and 1980, and might be considered as moderately common. Sixteen collecting sites lie within protected areas (the Nyungwe National Park and the Gishwati-Mukura National Park in Rwanda, the Kahuzi-Biega National Park in the Democratic Republic of the Congo, the Bwindi Impenetrable National Park in Uganda and the Kibira National Park in Burundi). The 14 other sites lie outside protected areas where the remnant forest patches are under threat related to human population growth. The increased human activities, including deforestation for agriculture, cattle grazing and wood harvesting, play a huge role in the degradation of the biota in which this species thrives. They lead us to estimate the number of locations for the species at 10, and to infer a continuing decline of habitat quality, of the number of populations, of mature individuals and of AOO. Therefore, based on the above information, the species has been listed as Endangered (EN).

Note – This species comprises two subspecies: subsp. *kahuzica* Verdc., endemic to eastern Democratic Republic of the Congo, differs from subsp. *bridsoniae* by having smaller, coriaceous leaves with a more obtuse apex, a grey bark on the branches and young twigs being densely pubescent. Below, we assess the subsp. *bridsoniae*.

Bibliography – Anonymous (2017), Bridson & Troupin (1985), Verdcourt (1985, 1987).

Rytigynia bridsoniae Verdc. subsp. ***bridsoniae***

Red List category – **Endangered (EN).**

IUCN criteria – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

Description – Characters like the species above, but leaves larger, thinner and with an acuminate apex.

Habitat – It occurs in the understorey of evergreen montane forest, at 1650–2350 m altitude.

Seed dispersal – Effective, probably by birds who eat the fleshy fruit then excrete seeds (endozoochory).

Distribution – Endemic to the Congo-Nile Divide, occurring in western Burundi and Rwanda and south-western Uganda.

Red List parameters – EOO: 16,036 km^2; AOO: 261 km^2; Number of locations: 5.

Justification – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1, whereas the area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The subspecies is represented in herbaria by 46 specimens, collected between 1947 and 1980, and might be considered as moderately common. Most of the collecting sites occur within protected areas (the Kibira National Park in Burundi, the Nyungwe National Park in Rwanda and the Bwindi Impenetrable National Park in Uganda) and one is close to the Gishwati National Park wherein it is likely present. The other ones lie outside protected areas in zones heavily populated where the remnant montane gallery forests are under threat of the machete and the hoe. These threats play a key role in biodiversity degradation including that of this species. They lead us to estimate the number of locations for the species at 5 and to infer a

decline in habitat quality, mature individuals, number of locations, as well as in EOO and AOO. Hence, based on the above information, the subspecies has been listed as Endangered (EN).

Bibliography – Verdcourt (1985, 1987).

◄ ***Rytigynia bridsoniae* subsp. *bridsoniae*** – Flowering branch (A), stipules (B), flower bud (C), flower (D), idem, cross section (E), inside upper part of corolla tube (F), anther (G), style and stigma (H), ovary, cross section (J), idem, transverse section (K), fruiting twig (L), fruit (M), seed (N). Drawing by Maureen Church (©), reproduced with permission from Verdcourt (1987).

Rytigynia kigeziensis Verdc.

Red List category – **Vulnerable (VU)**.

IUCN criteria – B1ab(i,iii)+2ab(i,iii).

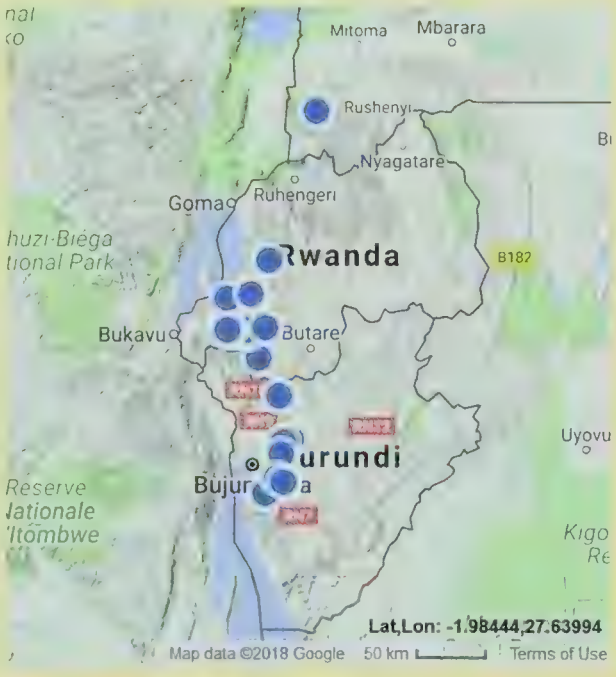
Description – A shrub or small tree of 2–8 m tall, with grey smooth persistent bark on the trunk; leaf blade glabrous or very sparsely hairy, pale green to green, veins on lower surface distinct; inflorescence with 2 or 3 flowers; corolla lobes with 1.5–2.5 mm long appendix; style 6–8 mm long; fruit 10–12 × 6–10 mm, with 1 or 2 pyrenes, often drying ± curved when with only 1 pyrene.

Vernacular names – Umushabarara, uruhama (in kinyarwanda).

Habitat – It occurs in evergreen montane forest, at 1800–2700 m altitude.

Seed dispersal – Effective, probably by birds who eat the fleshy fruit then excrete seeds (endozoochory).

◄ ***Rytigynia kigeziensis*** – Flowering twig (A), stipules (B), flower bud (C), flower (D), idem, cross section (E), inside upper part of corolla tube (F), anther (G), style and stigma (H), ovary, cross section (J), idem, transverse section (K), fruiting twig (L), fruit (M), pyrene (N). Drawing by Maureen Church (©), reproduced with permission from Verdcourt (1987).



DISTRIBUTION – Endemic to the Congo-Nile Divide region, occurring in western Burundi, western Rwanda and south-western Uganda.

RED LIST PARAMETERS – EOO: 8,902 km²; AOO: 207 km²; Number of locations: ± 7.

JUSTIFICATION – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1, whereas the area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. This species is represented in herbaria by 44 specimens recorded between 1949 and 1999, and might be considered as moderately common. Most of the collecting localities fall within well-protected areas (the Kibira National Park in Burundi, the Nyungwe National Park in Rwanda and the Bwindi Impenetrable National Park in Uganda). The other ones, including the one from southern Uganda, lie outside protected areas in zones where the relic forest patches are under threat from clearing for agriculture and livestock grazing as well as wood harvesting. These threats play a key role in biodiversity degradation including that of this species. They lead us to estimate the number of locations for the species at 7 and to infer a decline in at least EOO and habitat quality. Therefore, based on the above information, the species has been listed as Vulnerable (VU).

BIBLIOGRAPHY – Bridson & Troupin (1985), Ntore & *al.* (2017a69), Verdcourt (1985, 1987).

Rytigynia ruwenzoriensis (De Wild.) Robyns

RED LIST CATEGORY – **Vulnerable (VU)**.

IUCN CRITERIA – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

SYNONYMS – *Vangueria ruwenzoriensis* De Wild., *Rytigynia ruwenzoriensis* (De Wild.) Robyns var. *breviflora* (De Wild.) Robyns.

DESCRIPTION – A shrub or small tree of up to 10 m tall; stipules with appendix of 1.5–2 mm long; leaf blade lanceolate, glabrous or very sparsely hairy, not membranaceous; inflorescence with numerous flowers; corolla lobes without appendix, tube subcylindrical; ovary with 3 to 5 locules; fruit usually spherical, with 1 to 5 pyrenes.

◄ ***Rytigynia ruwenzoriensis*** – Flowering twig (A), stipule (B), fruiting twig (C). Drawing by Dominic Troupin (©), reproduced with permission from Bridson & Troupin (1982).

HABITAT – It occurs in the understorey of evergreen submontane and montane forest, at 1400–2400 m altitude.

SEED DISPERSAL – Effective, probably by birds who eat fruits then excrete seeds (endozoochory).

DISTRIBUTION – Endemic to the Albertine Rift, where it occurs in western Burundi, south-eastern Rwanda, north-eastern Democratic Republic of the Congo and south-western Uganda.

RED LIST PARAMETERS – EOO: 46,403 km²; AOO: 99 km²; Number of locations: 6.

JUSTIFICATION – The extent of occurrence (EOO) far exceeds the upper limit for the Vulnerable category under sub-criterion B1, whereas the area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. This species is known from 17 herbarium specimens, recorded between 1914 and 1981, and might be considered as moderately rare. Most of the collecting sites lie within protected areas (the Virunga National Park in the Democratic Republic of the Congo and the Bwindi Impenetrable National Park in Uganda), while two localities lie outside protected areas. Here, the remnant forest fragments are doomed to the machete and the hoe. Moreover, the Virunga National Park is potentially threatened by oil exploration. These threats play a key role in the habitat degradation including

that of this species. They lead to an estimation the number of locations for the species of 6 and to presume a continuing decline in EOO, AOO, extent and quality of habitat, number of locations and number of mature individuals. Therefore, based on this information, the species has been listed as Vulnerable (VU).

Bibliography – Anonymous (2017), Ntore & *al.* (2017a70), Verdcourt & Bridson (1991).

Sabicea becquetii (N.Hallé) Razafim., B.Bremer, Liede & Saleh A.Khan

Red List category – **Vulnerable (VU)**.

IUCN criteria – B1ab(ii,iii,v)+2ab(ii,iii,v).

Synonyms – *Pseudosabicea becquetii* N.Hallé.

Description - A tufted shrub or suffrutex of 0.4–3 m tall; leaves anisophyllous, one leaf per pair half as long as the opposite one, blade densely pubescent; inflorescence a cymose, axillary glomerule with ciliate bracts; corolla white to white-pink, with 5 lobes, tube 8–9 × 2.7 mm; fruit red, 10 × 7 mm, sparsely hairy.

► ***Sabicea becquetii*** – Photos by Eberhard Fischer (©) taken at the Siguvyaye Valley, Burundi.

Habitat – It occurs in submontane to montane forest, at 1350–2000 m altitude.

Seed dispersal – Effective, by birds who eat fruits then excrete seeds (endozoochory).

Distribution – Endemic to the Albertine Rift, occurring in western and southern Burundi and western Tanzania.

Red List parameters – EOO: 4,285 km²; AOO: 189 km²; Number of locations: 6.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) both comply with the criteria for the Endangered category under sub-criteria B1 and B2. This species is known from 26 herbarium specimens, collected between 1931 and 2014, and can be considered as moderately common. Unfortunately, only three out of these localities lie inside protected areas (the Bururi Forest Nature Reserve, the Kibira National Park and the Kinoso Natural Reserve in Burundi and Gombe Stream National Park in Tanzania) where the habitat seems secured. Several other localities lie in an area subject to heavy demographic pressure on the suitable remnant forest patches and the species that they shelter. The collecting sites dating from before 1985 have likely already lost or severely reduced due to forest loss and degradation to give way to agriculture and pasture, and due to wood harvesting. These threats lead us to estimate the total number of locations for the species at 5 and to infer a continuing decline in the AOO, habitat quality and number of mature individuals. Therefore, based on the above information, the species has been listed as Vulnerable (VU).

Bibliography – Hallé (1964), Khan & *al.* (2008), Ntore & *al.* (2017a71).

Sericanthe burundensis Robbr.

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(iii)+2ab(iii).

Description – A shrub to small tree of 3–6 m tall, often climbing and reaching 12 m; stipules with 3–8 mm long sheath and 1–3 mm long bristle; leaf blade elliptic to obovate, papyraceous, pubescent, domatia with dense hairs in axils of veins, with 2 to 4 bacterial leaf galls; flowers 7–8-merous, pubescent outside; drupes ± 2 cm in diameter, orange, sparsely pubescent.

Habitat – It occurs in montane forest undergrowth, at 1900–2500 m altitude.

Seed dispersal – Effective, by birds who eat fruits then excrete seeds (endozoochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi.

Red List parameters – EOO: 644 km²; AOO: 63 km²; Number of locations: 3.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) both comply with the criteria for the Endangered category under sub-criteria B1 and B2. This species is represented in herbaria by 13 specimens, collected between 1970 and 2014, and can be considered as moderately rare. Fortunately, most of the collecting localities lie within protected areas (the Kibira National Park and the Bururi Forest Nature Reserve), where the populations are relatively safe. The others lie in areas with increasing human population pressure from clearing, deliberate bush fires, cattle grazing and firewood harvesting. This has adverse effects on the relic forest fragments playing a key role in biodiversity conservation. Hence, the habitat, including the only in which this species is found, is degrading. This threat leads us to estimate the number of locations at 3 and to infer a continuing decline of habitat quality. Therefore, based on the above observations, the species has been listed as Endangered (EN).

Bibliography – Ntore & *al.* (2017a72), Robbrecht (1978).

◄ ***Sericanthe burundensis*** – Scan of the isotype specimen (Lewalle 5668) at BR; photo by Salvator Ntore (©) taken at Bururi Forest Nature Reserve, Burundi.

Rutaceae

Vepris renieri (G.C.C.Gilbert) Mziray

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

Synonyms – *Oricia renieri* G.C.C.Gilbert.

Description – A tree or shrub of up to 4 m tall; branchlets rusty-hairy, glabrescent; leaves 3-foliolate, alternate; petiole 10 cm long, grooved; leaflets with short petiolules, elliptic-oblanceolate, 22–30 × 7–10 cm, glabrous, coriaceous, gland-dots beneath hardly visible.

Habitat – It occurs in montane forest, at 1800–2000 m altitude.

Seed dispersal – Effective, probably by birds who eat fruits, then excrete seeds (endozoochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, south-western Rwanda and eastern Democratic Republic of the Congo.

► ***Vepris renieri*** – Photos by Eberhard Fischer (©) taken at Cyamudongo (fruits) and the Kamiranzovu Swamp (flowers), Rwanda.

RED LIST PARAMETERS – EOO: 3,692 km^2; AOO: 54 km^2; Number of locations: 4.

JUSTIFICATION – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits for the Endangered category under sub-criteria B1 and B2. It is known from 7 herbarium specimens, recorded between 1950 and 1980, and can be considered as rare. Most of the collecting localities lie within protected areas (the Nyungwe National Park in Rwanda, the Kibira National Park in Burundi and the Kahuzi-Biega National Park in the Democratic Republic of the Congo). The others lie outside protected areas where they are under threat related to increasing human activities such as mining, cattle grazing, clearing and crop cultivation. These threats are the underlying cause of the loss of habitat and biodiversity degradation, which affects this species. They lead us to estimate the number of locations at 4 and to infer a decline in EOO, AOO, number of locations, habitat quality, and number of mature individuals. Therefore, based on the above information, this species has been listed as Endangered (EN).

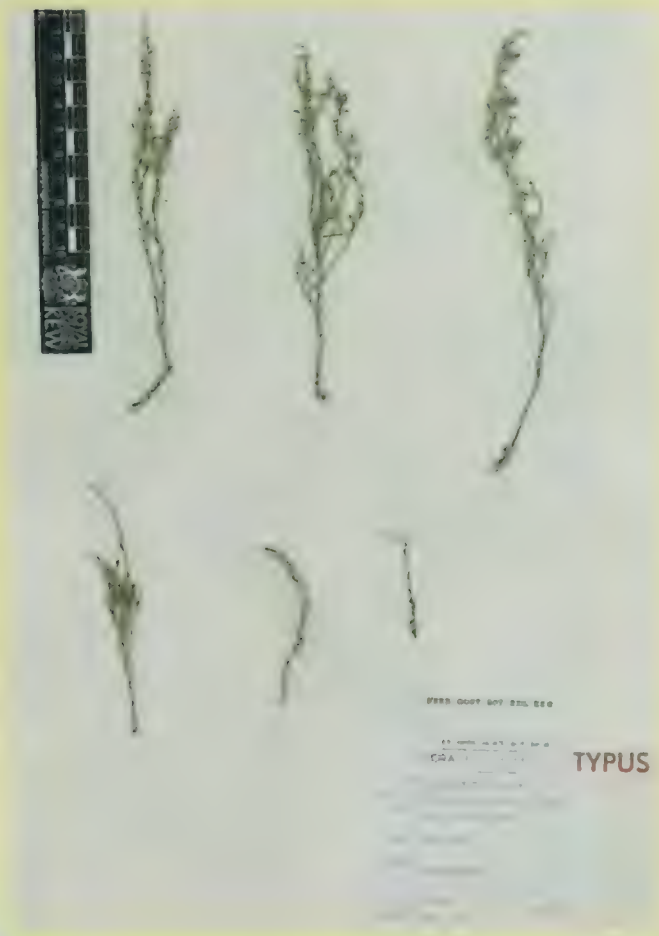
BIBLIOGRAPHY – Fischer & Killman (2008), Gilbert (1958a, 1958b), Mziray (1992).

Thesium germainii Robyns & Lawalrée

Red List category – **Critically Endangered (Possibly Extinct) (CR (PE)).**

IUCN criteria – B2ab(iii,v).

Description – A perennial herb, drying olive-green; rhizome erect, woody; stems tufted, erect, up to 21 cm tall; cauline leaves sparse, ovate-triangular, 2 × 1.2 mm, with ciliolate margin; inflorescence terminal; flowers sessile, 5-merous; receptacular tube 0.7 mm long; tepals lanceolate, cucullate, 1 × 0.3–0.4 mm, with inflexed papillose margin.



◄ ***Thesium germainii*** – Scan of the isotype specimen (Germain 8615) at K.

Habitat – It occurs in wooded savannah, at nearly 1000 m altitude.

Seed dispersal – Limited, by ants who transport the seeds (myrmecochory).

Distribution – Only known from the Mosso region in eastern Burundi.

Red List parameters – EOO: not applicable; AOO: 9 km²; Number of locations: 1.

Justification – With only one collecting site where the species has been observed, it is not possible to calculate its extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits for the Critically Endangered category (CR) under sub-criterion B2. This species is only known from the type specimen collected in 1955 and is thus very rare. Unfortunately, it occurs in an unprotected area more and more heavily populated, where conversion for

expending agriculture and farming is currently perceived to be the most important and direct threat for the wooded savannah in which the species was present. This threat is the underlying cause of biodiversity loss including the loss of this species if it still exists. It is thought to result in a continuing decline of habitat quality, and also of mature individuals. Therefore, based on the above information, the species has been listed as Critically Endangered (CR). Because of the threats explained above, and the fact that it has not been observed in the wild for over 60 years, the label Possibly Extinct (PE) has been added.

BIBLIOGRAPHY – Ntore & *al.* (2017a73), Robyns & Lawalrée (1961).

Thesium lewallei Lawalrée

RED LIST CATEGORY – **Critically Endangered (Possibly Extinct) (CR (PE)).**

IUCN CRITERIA – EN (PE) B2ab(iii).

DESCRIPTION – A perennial herb, drying dark green; rhizome erect, thick, woody; stems erect, tufted, up to 35 cm tall; leaves dense at base, mid-stem leaves sparse, 35 × 0.75 mm; inflorescence a terminal or intercalary spike; bracts linear, up to 10 mm long; flowers axillary, sessile, 5-merous; receptacular tube 1.25 mm long; tepals 2 mm long.

◄ ***Thesium lewallei*** – Scan of a paratype specimen (Lewalle 1326) at BR.

Habitat – It occurs in recently burnt savannah, wooded savannah, savannah with *Entada*, *Combretum* or *Protea*, at 900–1000 m altitude.

Seed dispersal – Limited, by ants who transport seeds (myrmecochory).

Distribution – Only known from the Rusizi plain, in western Burundi.

Red List parameters – EOO: Not applicable; AOO: 18 km^2; Number of locations: 1.

Justification – With only two collecting sites where the species has been observed, it is not possible to calculate its extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits of the Endangered category (EN) under sub-criterion B2. The species is known from only five herbarium specimens, collected between 1966 and 1976 on two different sites. It is thus very rare, but said to be locally common. Unfortunately, both collecting localities lie outside protected areas, where savannahs are severely affected by habitat loss due to ever-increasing demands for land by the exploding human population. Expanding human activities include agriculture, livestock farming, and urbanization. Indeed, the town of Bubanza has increased several fold in recent years, which, when combined with the above activities, puts a strong pressure upon the rare remaining natural habitats. This threat leads us to assess a single location for the species and it is thought to result in a continuing decline of habitat quality. Therefore, based on the above information, the species has been listed as Critically Endangered (CR). Because of the threat explained above, and the fact that it has not been observed in the wild for 40 years, the label Possibly Extinct (PE) has been added.

Bibliography – Lawalrée (1985), Ntore & *al.* (2017a74).

Thesium reekmansii Lawalrée

Red List category – **Least Concern (Conservation Dependent) (LC (CD))**.

Description – A perennial glabrous herb, drying greyish-green; rhizome horizontal; stems many, tufted, up to 30 cm tall; cauline leaves sparse, scale-like, 1–2 mm long; inflorescence a terminal spike, lax; bracts 1.5–3 mm long; flowers axillary, sessile, 4(–5)-merous; receptacular tube ± 0.5 mm long; tepals linear, 2.2 mm long.

Habitat – It occurs in afroalpine meadow, at 2500 m altitude.

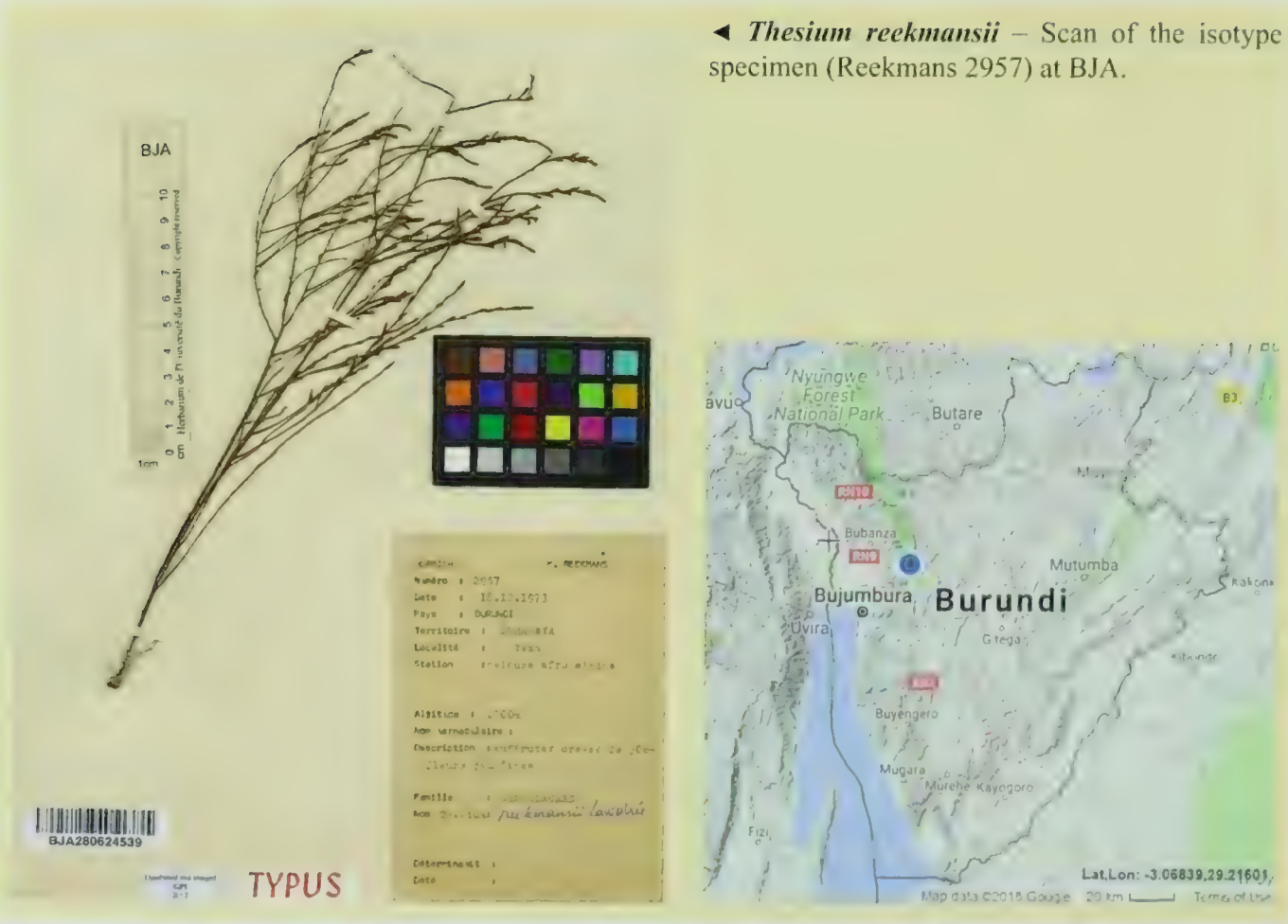
Seed dispersal– Limited, by ants who transport seeds (myrmecochory).

Distribution – Endemic to the Congo-Nile Divide, occurring in western Burundi.

Red List parameters – EOO: Not applicable; AOO: 9 km^2; Number of location: not applicable.

Justification – With only one collecting site where the species has been observed, it is not possible to calculate its extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits of the Critically Endangered (CR) category under sub-criterion B2. The species is only known from type specimen collected in 1977, and is thus very rare. Luckily, the collecting locality lies inside the Kibira National Park, where is seems safe. Thus, at present, no obvious threat to this plant may be identified, and the species is thought to have a stable population. Therefore, based on the above information, the species has been listed as Least Concern (LC). However, because its entire occurrence is within a protected area, the label Conservation Dependent has been added (CD).

Bibliography – Lawalrée (1985), Ntore & *al.* (2017a75).



◄ ***Thesium reekmansii*** – Scan of the isotype specimen (Reekmans 2957) at BJA.

Sapotaceae

Afrosersalisia rwandensis (Troupin) Liben

Red List category – **Endangered (EN).**

IUCN criteria – B2ab(ii,iii).

Synonyms – *Chrysophyllum rwandense* Troupin, *Englerophytum rwandense* (Troupin) med., *Zeyherella rwandensis* (Troupin) Liben.

Description – A tree or shrub of 10–20 m tall; leaf blade elliptic to oblanceolate, 4–12 × 1–3.5 cm; inflorescence axillary, in fascicles of 3 to 10 flowers; pedicel pubescent; corolla 4–6 mm long, with 4 or 5 ovate-triangular lobes; drupes elliptic to subglobular, 2.5–3.2 × 1.3–1.8 cm; seed solitary.

Habitat – It occurs in montane forests, at 1900–2400 m altitude.

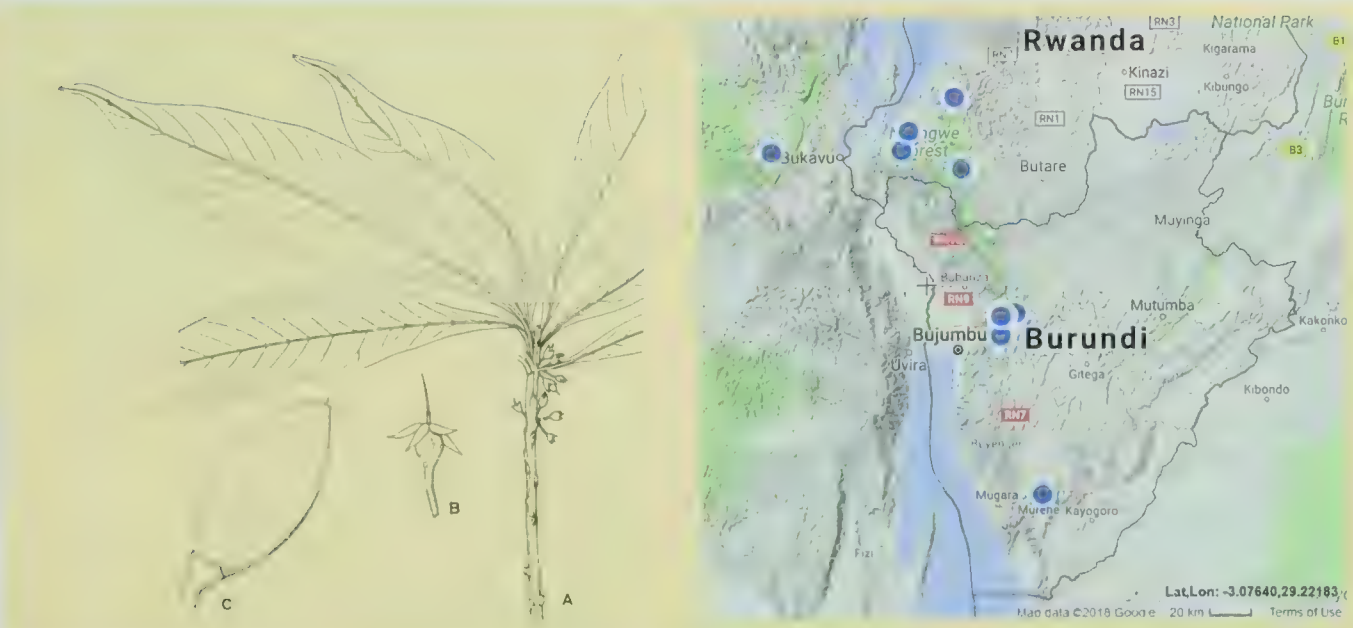
Seed dispersal – Effective, by vertebrates eating the fruit (endozoochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi and south-western Rwanda and in eastern Democratic Republic of the Congo.

Red List parameters – EOO: 9,907 km²; AOO: 99 km²; Number of locations: 4.

JUSTIFICATION – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits of the Endangered category under sub-criteria B1 and B2. The species is represented in herbaria by 16 specimens, collected between 1959 and 1984, and seems to be moderately rare. It is reported to have a low population density in localities where it is known. Almost all collecting sites lie inside protected areas (the Kibira National Park and the Nyungwe National Park in Rwanda and the Kahuzi-Biega National Park in the Democratic Republic of the Congo), where the species is fairly secure. However, the two other ones lie outside protected areas, in remnant forest fragments which are under pressure from ever-increasing demands for land by the exploding human population. The corollary of increasing human activities like cattle grazing, crop cultivation, deforestation, and others related with human inhabitance, threaten the species' habitat. These threats allow us to estimate the number of locations for the species at 4. They also lead us to infer a decline in AOO, and in habitat quality. Therefore, based on these data, it has been listed as Endangered (EN).

BIBLIOGRAPHY – Liben (1991), Ntore & *al.* (2017a76), Troupin (1982).



Afrosersalisia rwandensis Flowering branch (A), flower (B), fruit (C). Drawing by D. Troupin (C), reproduced with permission from Troupin (1985).

Scrophulariaceae *s.l.*

NOTE: The Scrophulariaceae are taken here in its broader sense. In a more narrow family concept, the species *Buchnera libenii* and *Harveya wysockiana* would belong to Orobanchaceae, while *Linderniella boutiqueana* would be a member of Linderniaceae.

Buchnera libenii Mielcarek

RED LIST CATEGORY – **Critically Endangered (Possibly Extinct) (CR (PE)).**

IUCN CRITERIA – B2ab(iii).

DESCRIPTION – An annual, erect, hemiparasitic herb of 11–20 cm tall; basal leaves rosulate; inflorescence a short terminal spike; flowers opposite, sessile; calyx hispid, with 5 equal teeth; corolla mauve-purple, tube cylindric, ± 5 mm long, lobes obovate, 1.2–1.4 × 0.6–0.7 mm.

HABITAT – It occurs in grassland, at 2000 m altitude.

SEED DISPERSAL – Ineffective, short-distance, with seeds shed from a septicidal capsule.

DISTRIBUTION – Known only from south-eastern Burundi.

RED LIST PARAMETERS – EOO: not applicable; AOO: 9 km²; Number of locations: 1.

► ***Buchnera libenii*** – Habit (A), detail of inflorescence (B), flower with bract and bracteole (the 2nd bracteole hidden) (C), detail of calyx and corolla (D), stamens (E, F). Drawing by Eberhard Fischer (©).

JUSTIFICATION – With only a single collection site where the species has been observed, it is not possible to calculate an extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits of the Critically Endangered category under sub-criterion B2. The species is only known from the type specimen, collected in 1972, indicating it is very rare. That type locality is situated in unprotected area where the grassland is becoming increasingly converted into pasture for livestock and into timber plantations of alien species which strongly compete with native ones. This increasing human pressure upon the grassland leads us to infer a rapid continuing decline in habitat quality. Based on the above observations, the species is listed as Critically Endangered (CR). Because major parts of the only site where is has been observed do no longer carry suitable habitat, and the species has not been observed for 45 years, the label Possibly Extinct (PE) has been added.

BIBLIOGRAPHY – Gereau & *al.* (2017), Mielcarek (1996).

Harveya wysockiana Mielcarek

RED LIST CATEGORY – **Endangered (EN).**

IUCN CRITERIA – B1ab(i,ii,iii,iv,v)+B2ab(i,ii,iii,iv,v).

DESCRIPTION – A perennial, holoparasitic herb of 9–54 cm tall, entirely white, becoming black when drying; leaves small, scale-like; inflorescence racemose; corolla white, tube 1.4–1.7 cm long, lobes 0.6–1.2 × 0.7–0.8 cm, densely ciliate at margin.

HABITAT – It occurs in the understory of montane forest, at 1900–2100 m altitude.

► ***Harveya wysockiana*** – Habit (A, B), detail of inflorescence (C), margin of corolla lobe showing hairs (D), stamen (E). Drawing by Eberhard Fischer (©).

SEED DISPERSAL – Unknown. Effective, by wind (anemochory) and possibly also by ants (myrmechory) and caching vertebrates (epizoochory).

DISTRIBUTION – Only known from the Congo-Nile Divide, in western Burundi.

RED LIST PARAMETERS – EOO: 148 km²; AOO: 27 km²; Number of locations: 3.

JUSTIFICATION – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the Endangered (EN) category under sub-criteria B1 and B2. The species is only known from 7 herbarium specimens, collected between 1971 and 2004, and should be considered as rare. Four out of the seven collecting sites lie within protected areas (the Kibira National Park and the Bururi Forest Nature Reserve). The other ones lie near Bugarama outside protected areas. This parasitic plant must rely totally on its host(s). Unfortunately, we have no information about its host species. Based on the above, it has been assessed as Endangered (EN).

BIBLIOGRAPHY – Mielcarek (1996).

Linderniella boutiqueana (R.Germ.) Eb.Fisch., Schäferh. & Kai Müll.

RED LIST CATEGORY – **Critically Endangered (Possibly Extinct) (CR (PE)).**

IUCN CRITERIA – B2ab(iii).

SYNONYMS – *Lindernia boutiqueana* R.Germ.

DESCRIPTION - An annual herb, up to 5 cm tall; leaves 4 to 6; petiole 3–4 mm long; blade 10–16 × 12 mm; flowers axillary; pedicel 10–13 mm long; calyx 3–3.5 mm long; corolla bilobed, pale purple to violet, upper lip bifid, lower lip 3-lobed; stamens 4, the abaxial filaments geniculate; capsule up to 10 mm long; seeds bothrospermous.

◄ ***Linderniella boutiqueana*** – Habit (A), opened corolla (B), abaxial stamen (C), adaxial stamen (D), calyx with fruit (E). Drawing by Eberhard Fischer (©), reproduced with permission from Fischer (1999).

HABITAT – It occurs in savannahs with *Themeda triandra, Bulbine asphodeloides* and *Hyphaene ventricosa,* on sandy soil, at 780–800 m altitude.

SEED DISPERSAL – Effective, by seeds dispersed by wind (anemochory).

DISTRIBUTION – Endemic to the Rusizi plain, in western Burundi.

RED LIST PARAMETERS – EOO: Not applicable; AOO: 18 km²; Number of locations: 1.

JUSTIFICATION – With only two collecting sites where the species has been observed, it is not possible to calculate its extent of occurrence (EOO). The area of occupancy (AOO) complies with the criterion for the Critically Endangered category under sub-criterion B2. This species is known from 7 specimens, recorded between 1950 and 1979, and can be considered as rare. Unfortunately, none of the known collecting localities lie within a well-protected area. It is likely to be present in the poorly managed Rusizi Natural Reserve, which is facing various threats, including a rapid invasion by population, expanding agriculture, firewood harvesting and charcoal production, as well as cow breeding within the boundaries of the Reserve. In addition, the zone outside the Reserve is suffering from the expansion of housing and urbanization consecutive to the exploding human population. As a result, the few remaining

natural habitats, such as savannah where this species could be present, are being destroyed and are becoming increasingly rare or even lost. The town of Gatumba for instance has increased several fold in recent years, which, when combined with increased urbanization along the shores west of Bujumbura, places increased pressure on the habitat. Finally, oil exploration, which was tried in the past on the Ruzizi plain, could restart in the near future (Becker & *al.*, 2010). Based on the above observations, this species has been classified as Critically Endangered (CR). Because of the severe alterations of its natural habitat, and the fact that it has not been reported for the last 37 years, the label Possibly Extinct (PE) has been added.

Bibliography Becker & *al.* (2010), Fischer (1999), Fischer & *al.* (2013), Germain (1952), Ntore & *al.* (2017f10).

Turneraceae

Stapfiella lucida Robyns

Red List category – **Endangered (EN)**.

IUCN criteria – B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v).

Description – A shrub of 1.5–3 m tall; leaves elliptic, shiny, with crenate-serrate margin; sepals with black glands; petals 5–6 mm long; capsule olive-greenish and with black glands.

Vernacular names – Nzingati (in kinyarwanda).

Habitat – It occurs in submontane to montane rain forests, at (800–)1650–2400 m altitude.

Seed dispersal – Limited, seeds released by explosive dehiscence of the capsules (ballochory) and possibly also dispersed by ants (myrmecochory).

Distribution – Distributed in western Burundi, south-western Rwanda, and south-western Gabon.

Red List parameters – EOO: 189,673 km^2; AOO: 81 km^2; Number of locations: 5.

Justification – The extent of occurrence (EOO) is far exceeding the 20,000 km^2 upper limit of the Vulnerable category under sub-criterion B1, whereas the area of occupancy (AOO) falls within the limits of the Endangered category (EN) under sub-criterion B2. The species is represented in herbaria by 25 specimens, collected between 1959 and 2009 at only nine sites,

showing it is moderately rare. Four of the nine collecting sites lie within protected areas (the Bururi Forest Nature Reserve in Burundi and the Nyungwe National Park in Rwanda). Five other sites lie outside protected areas where they are under habitat loss linked to the ever-increasing demands for land by the exploding human population. This human population growth induces increasing human activities like cattle grazing, bushfires, cutting firewood, crop cultivation, and others related with human inhabitance like gold mining. The habitat loss and degradation poses a great threat to the species and leads us to estimate the number of locations at 3. It also allows us to infer a decline in habitat quality and number of mature individuals. Based on the information above, the species has been assessed as Endangered (EN).

NOTE – *Stapfiella lucida* comprises two varieties: var. *lucida* and var. *pubescens*. The var. *pubescens* occurs only in north-western and south-western Burundi and is assessed below. The outlier population in Gabon differs slightly from the remainder and a taxonomic study is advised.

BIBLIOGRAPHY – Leal & Sosef (2011), Robyns (1964, 1967).

Stapfiella lucida Robyns var. ***pubescens*** Verdc.

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B1ab(iii,v)+2ab(iii,v).

DESCRIPTION – A shrub of up to 1.5–3 m tall; branches glabrous; leaves alternate, densely aggregated at apex of branches; blade elliptic, up to 14 × 5 cm, acute-acuminate at apex and acute at base, shining, margin crenate-serrate, with numerous small blackish glands, pubescent below; inflorescence in terminal and axillary panicles of up to 10 cm long, glabrous; flowers white, glabrous, up to 1.2 cm in diameter; calyx with exterior blackish glands, sepals pubescent towards the base; fruit an ovate capsule with blackish glands, up to 0.5 cm long.

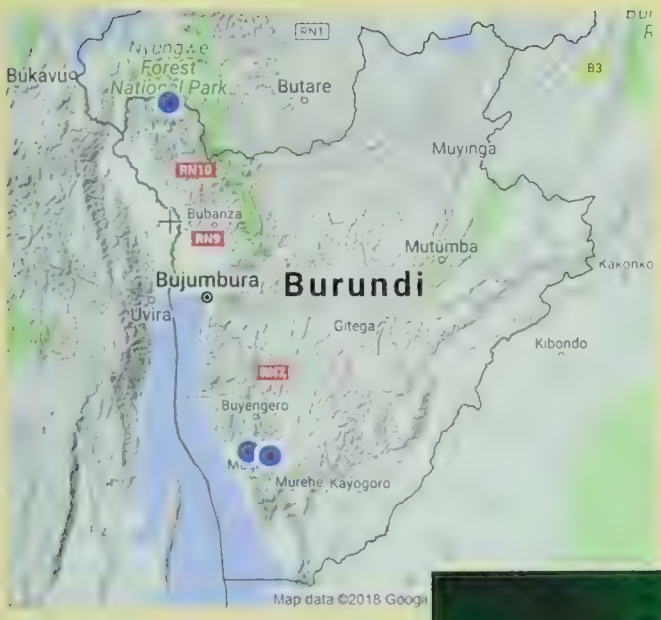
HABITAT – It occurs in forests, at 1650–1900 m altitude.

SEED DISPERSAL – Limited, seeds released by explosive dehiscence of the capsules (ballochory) and possibly also dispersed by ants (myrmecochory).

DISTRIBUTION – Endemic to the Congo-Nile Divide, occurring in western Burundi.

RED LIST PARAMETERS – EOO: 663 km^2; AOO: 27 km^2; Number of locations: 3.

JUSTIFICATION – The extent of occurrence (EOO) and the area of occupancy (AOO) fall within the Endangered category under sub-criteria B1 and B2. This variety is represented in herbaria by 6 specimens, collected between 1967 and 1981, and should be considered as rare. One of the four collecting sites falls inside a protected area (the Bururi Forest Nature Reserve) while another one is located near the northern Kibira National Park but seems to be under threat due to habitat loss and degradation resulting from agriculture expansion and gold mining. The two other sites lie outside protected areas where the relic forest fragments are subject to increasing human activities like bushfires, cutting of firewood, crop cultivation, and others related with human inhabitance. This forest habitat loss poses a great threat to many plant species including the present variety. It leads us to estimate the number



► ***Stapfiella lucida* var. *pubescens*** – Photos by Eberhard Fischer (©) taken at Kumuyange, Burundi.

of locations for this variety at 3 and to infer a decline in habitat quality and number of mature individuals. Based on the above observations, the variety has been listed as Endangered (EN).

BIBLIOGRAPHY – Ntore & *al.* (2017a77), Verdcourt (1973).

Vitaceae

Cyphostemma michelii (Dewit) Desc.

RED LIST CATEGORY – **Critically Endangered (Possibly Extinct) (CE (PE)).**

IUCN CRITERIA – B2ab(iii).

SYNONYMS – *Cissus michelii* Dewit.

DESCRIPTION – An erect herb of ± 1 m tall, without tendrils; leaves digitate, 3(–5)-foliolate, with glandular hairs; inflorescence in cymes of up to 12 cm long; calyx with glandular hairs; petals white-yellowish, at base with glandular hairs; berries pubescent.

HABITAT – It occurs in open *Brachystegia* woodland, at around 1200 m altitude.

SEED DISPERSAL – Effective, by birds eating the fruit then excrete seeds (endozoochory).

► ***Cyphostemma michelii*** – Scan of the holotype specimen (Michel 3208) at BR.

DISTRIBUTION – Only known from the Mosso Region, in eastern Burundi.

RED LIST PARAMETERS – EOO: Not applicable; AOO: 9 km²; Number of locations: 1.

JUSTIFICATION – With only one collecting site where the species has been observed, it is not possible to calculate its extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits of the Critically Endangered category under sub-criterion B2. This species is clearly very rare because untill now it is known only from the type specimen collected in 1951. Unfortunately, the collecting locality lies in an area that suffers from increased human pressure which threatens to destroy the forest habitat. This pressure is due to activities like cattle grazing, crop cultivation, deforestation and others related with human inhabitance. These threats lead us to infer a continuing decline of the species. Therefore, based on the above information, it has been classified as Critically Endangered (CR). Because of the threats mentioned, and the fact that it has not been reported for 65 years, the label Possibly Extinct (PE) has been added.

BIBLIOGRAPHY – Dewit (1959), Dewit & Willems (1960), Ntore & *al.* (2017a78)

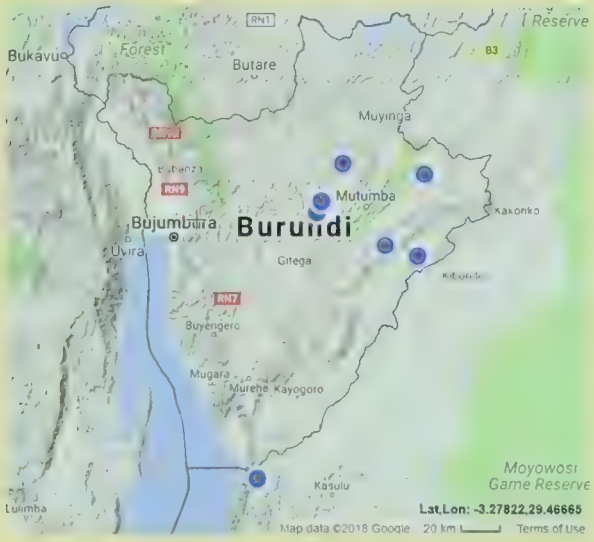
Cyphostemma vanderbenii (Dewit) Desc.

Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(ii,iii).

Synonyms – *Cissus vanderbenii* Dewit.

Description – A climber of up to 1.5 m long; tendrils glabrous; leaves composed-digitate, blade with sparse glandular hairs on midrib; pedicel without glandular hairs; inflorescence of composed cymes, up to 10 cm long; petals without glandular hairs, glabrous; berries ovoid, up to 8 × 4 mm, glabrous.



◄ ***Cyphostemma vanderbenii*** – Scan of the holotype specimen (Van der Ben 1826) at BR.

Habitat – It occurs in woodland, gallery forest, grassland with bracken and some scattered shrubs and in fallow land, at 1450–1800 m altitude.

Seed dispersal – Effective, by birds who eat fruits then excrete seeds (endozoochory).

Distribution – Distributed throughout central, eastern, and north-eastern Burundi, as well as western Tanzania.

Red List parameters – EOO: 5,737 km²; AOO: 63 km²; Number of locations: 4.

JUSTIFICATION – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1 and the area of occupancy (AOO) falls within the limits of the Endangered category under sub-criterion B2. This species is known from 7 specimens, recorded between 1951 and 1975, and can be considered as rare. All collecting sites lie within unprotected areas strongly impacted by increasing human activities. These include cattle grazing, crop cultivation, deforestation, and others related with human occupation. These threats lead us to estimate the number of locations for the species at 4 and to infer a continuing decline in extent and quality of habitat, number of sub-populations and mature individuals, and thus also of EOO and AOO. Therefore, the species has been listed as Endangered (EN).

BIBLIOGRAPHY – Dewit & Willems (1960), Ntore & *al.* (2017a79)

SPERMATOPHYTA
MONOCOTYLEDONAE

Anthericaceae

Chlorophytum burundiense Meerts

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B2ab(ii,iii).

DESCRIPTION – A herb of 5–35 cm tall, glabrous throughout, solitary or tufted, with a short, vertical rhizome and inflated roots; leaves rosulate, linear to elliptic, up to 0.6 cm wide; inflorescence a raceme; anther much shorter than filament.

◄ ▲ ***Chlorophytum burundiense*** – Photos by Eberhard Fischer (©) taken at Mount Teza, Burundi.

Habitat - It occurs in dry or wet grassland, meadows with *Eragrostis*, tea plantations, scrub land with *Philippia* or in temporary pools, at (1300 -)2000–2700 m altitude.

Seed dispersal – Limited, by means of seeds falling out of a dry capsule (autochory).

Distribution – Known from the Albertine Rift in western Burundi, south-eastern Democratic Republic of the Congo, and south-western Tanzania.

Red List parameters – EOO: 128,272 km^2; AOO: 81 km^2; Number of locations: 4.

Justification –The extent of occurrence (EOO) exceeds the upper thresholds for the Vulnerable category under sub-criterion B1, whereas the area of occupancy (AOO) falls within the thresholds for the Endangered status under sub-criterion B2. The species is known from 10 herbarium specimens collected between 1957 and 1979 and can be considered as fairly rare. Its distribution is highly disjunct, with the main population in Burundi but a single collection from south-western Tanzania and one from south-eastern Democratic Republic of the Congo. The collection from Tanzania is situated ca 700 km south of all other collections, suggesting the species might exist elsewhere in mountains of western Tanzania. Two of the sites lie within the Kibira National Park in Burundi. The specimen from Tanzania has been collected near the Kitulo Plateau National Park in which it might well be present. Six out of the eight collection sites occur outside protected areas, which are subject to strong demographic pressure and under great threat of habitat loss. Grazing and trampling by the domestic livestock and the establishment of conifer plantations in some sites are destroying the grassy habitat and locally even leads to complete habitat loss. This results in a decline of the species in extent and quality of the habitat, and in AOO. But, due to the fact that it appears to be able to occupy a fairly wide range of habitats and the fact that it occurs in tea plantations shows that it might survive agricultural disturbance to some extent. By considering habitat loss, 4 locations have been identified throughout its distribution range. Therefore, it seems best to assess the species as Endangered (EN).

Bibliography – Meerts (2011, 2015), Ntore & *al.* (2017f2).

Chlorophytum cameronii (Baker) Kativu var. *ruziziense* Meerts

Red List catagory – **Endangered (EN).**

IUCN criteria – B1ab(iii)+2ab(iii).

Description – A herb of 20–90 cm tall; leaves conduplicate, distichous, 0.2–0.3 cm wide, margin ciliate; inflorescence a short raceme, 2–4(–8) cm long.

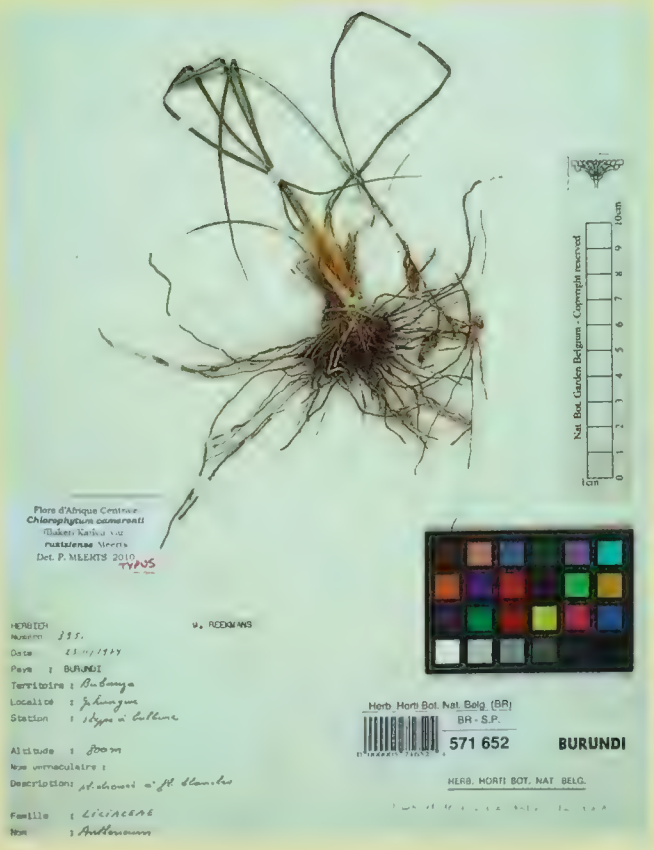
Habitat – It grows in savannah, on a plain surrounded by high divides, between 800 and 850 m altitude.

Seed dispersal – Limited, by means of seeds falling out of a dry capsule (autochory).

Distribution – Restricted to the Rusizi Plain, in western Burundi and in eastern Democratic Republic of the Congo.

Red List parameters – EOO: 182 km^2; AOO: 45 km^2; Number of locations: 2.

Justification – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the Endangered category under sub-criteria B1 and B2. Known from 11 herbarium



► ***Chlorophytum cameronii* var. *ruziziense*** – Scan of the holotype specimen (Reekmans 3955) at BR.

specimens collected between 1929 and 1975, this variety should be considered as fairly rare. All collecting sites occur outside protected areas, where multiple adverse environmental pressures on the land, include conversion of savannah to pasture land, agricultural extension, and urbanisation intensification are modifying the savannah habitat and leading to habitat loss. Some specimens were collected close to the Rusizi Nature Reserve, in which it is likely to be present. But the Reserve has recently been downgraded and effective management is lacking, because crop cultivation and fire wood collection are tolerated within its borders. Moreover, a private industrial company is installing sugarcane plantations and a factory near the protected reserve which bodes ill for its sustainability. Those threats are causing a continuous decline in both habitat quality and extent. By considering the loss of habitat, the variety occupies 2 locations. Based on the above observations, this taxon is assessed here in the Endangered category (EN).

Note – The species *Chlorophytum cameronii* comprises two varieties as a whole is widely spread in tropical Africa. Its EOO, AOO and number of locations are far exceeding the upper limits for any threat category and thus is classified as Least Concern (LC) (Thacker, 2017).

Bibliography – Meerts (2012, 2015), Ntore & *al.* (2017f3), Thacker (2017).

Chlorophytum hirsutum A.D.Poulsen & Nordal

Red List catagory – **Endangered (EN)**.

IUCN criteria – B2ab(iii).

Description – A herb of 0.3–1.3 m tall with subterranean rhizome; leaves, peduncle and pedicels pubescent; flowers in groups of 2 to 5.

HABITAT – Open forest, *Loudetia* grassland, forest margins among boulders, gallery forest, ravine with *Euphorbia*, at 675–1200 m altitude.

SEED DISPERSAL – Limited, by means of seeds falling out of a dry capsule (autochory).

DISTRIBUTION – Endemic to the Albertine Rift, occurring in western Burundi, eastern Democratic Republic of the Congo, and western Uganda.

RED LIST PARAMETERS – EOO: 12,159 km^2; AOO: 54 km^2; Number of locations: 2.

JUSTIFICATION – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1, while its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is currently known from only nine herbarium records collected between 1938 and 1974 and is considered to be rare. The collecting site in Uganda is geographically isolated from the other ones. All sites lie outside protected areas in regions where human population is steadily increasing, which involves irreversible conversion of large stretches of natural suitable gallery forest and savannahs to urban expansion, crop cultivation, wood harvesting, and livestock pasture. This ongoing habitat loss results in a continuing decline of the species' extent and habitat quality. By considering extension of crop cultivation, the species resides at 2 locations. Based on the above observations, the species is assessed as Endangered (EN).

BIBLIOGRAPHY – Meerts (2015), Ntore & *al.* (2017a15), Poulsen & Nordal (1999).

► ***Chlorophytum hirsutum*** – Reconstructed habit (only one rosette leaf shown) (A), close up of lower surface of leafy bract on peduncle (B), flower (C), fruit (D). Drawing by Axel D. Poulsen ©, reproduced with permission from Poulsen & Nordal (1999).

Amorphophallus lewallei Malaisse & Bamps

RED LIST CATEGORY – **Critically Endangered (Possibly Extinct in the Wild) (CR (PEW)).**

IUCN CRITERIA – B2ab(iii).

DESCRIPTION – A stemless, tuberous, terrestrial herb; spathe expanded, pale to dark brownish; sterile spadix short, densely verrucose, greenish; ovary unilocular.

HABITAT – It occurs in tree or open savannah, at around 900 m altitude.

SEED DISPERSAL – Limited, probably mostly by fruits-eating (i.e. frugivorous) birds that then excrete seeds (endozoochory).

◄ ***Amorphophallus lewallei*** – Photo by Wilbert Hetterscheid ©, taken from a cultivated plant, used with permission.

DISTRIBUTION – Endemic to the Rusizi Plain, in western Burundi.

RED LIST PARAMETERS – EOO: Not applicable; AOO: 18 km²; Number of locations: 1.

JUSTIFICATION – The area of occupancy (AOO) falls within the threshold for the Endangered category under sub-criterion B2. The species is currently known from only two herbarium specimens collected in 1969 and 1972, both from a well-collected area, and the species has not been seen in the wild since. It is known from a single restricted area, which is situated

in a zone strongly transformed by increasing human pressure. Its savannah habitat is heavily converted to agricultural land, and is also a scene of trampling by domestic livestock. Apart from these threats directly affecting the species, the loss of habitat is also likely to affect the occurrence of birds, which are thought to be important for seed dispersal. In the Katunguru Valley, where the type specimen was collected, a sclerophyllous forest relict of *Euphorbia dawei* located in this ravine is entirely destroyed to make way for crops. These varied impacts have led to a severe degradation of the suitable habitat, and it is thought this already caused the species to go extinct in the wild. It is cultivated by amateur plant growers, which may prove essential for its ex situ survival. Based on the above observations, *A. lewallei* is, when still present in the wild, facing an extremely high risk of extinction, and should be listed as Critically Endangered (CR), with the Possibly Extinct in the wild (PEW) tag.

Bibliography – eMonocot Team Araceae (2017), Galloway (1995), Ittenbach (2003), Malaisse & Bamps (1993), Ntore & *al.* (2017a17).

Cyperaceae

Ascolepis hemisphaerica Peter ex Goetgh.

Synonyms – *Cyperus ascohemisphaericus* Goetgh.

Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(iii).

Description – A perennial tufted sedge of up to 3–40 cm tall, with slender stolons; inflorescence capitate, the single spherical head 6–13 mm in diameter, whitish; spikelets 1-flowered.

Habitat – It occurs in grassland or in wet grasslands, at 1900–2500 m altitude.

Seed dispersal – Fair, in the fur of mammals and feathers of birds (?) (epizoochory).

Distribution – Known from the Nyakazu escarpment in eastern Burundi, Muniri, Kumuyange, and Rwamunyinya Hills in southern Burundi, as well as from Manga Hill on the Congo-Nile Divide in western Burundi, and from Mbeya in south-western Tanzania.

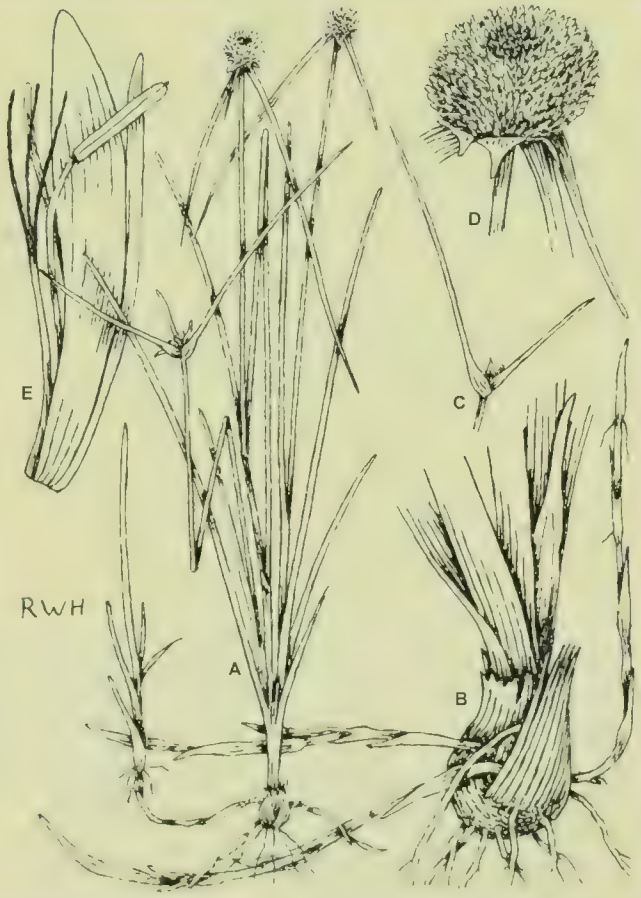
Red List parameters – EOO: 14,530 km^2; AOO: 63 km^2; Number of locations: 3.

Justification – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) within the limits for the Endangered category under sub-criterion B2. The species is known from 10 herbarium specimens collected between 1966 and 1991 and may be considered as moderately rare. Unfortunately, all collecting sites fall outside protected areas where natural suitable habitat for the species is subject to severe degradation or even complete loss due to the hoe and the domestic livestock hoof. The Tanzanian site is at 600 km distance from the Burundian ones, which is likely to be too large for effective gene flow between their individuals. By considering the habitat loss, the species occurs at 3 locations. These threats lead us to infer a

severe, rapid and continuing decline in the quality and extent of its habitat. Therefore, based on the above information, the species has been listed as Endangered (EN).

BIBLIOGRAPHY – Bauters & *al.* (2014), Goetghebeur (1980), Ntore & *al.* (2017a32).

► ***Ascolepis hemisphaerica*** – Habit (A), stolons and culm-base (B), young inflorescence with involucral bracts (C), mature inflorescence with involucral bracts (D), spikelet (E). Drawing by Richard W. Haines (©), reproduced with permission from Haines & Lye (1983).



Bulbostylis nemoides Goetgh.

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B1ab(iii)+2ab(iii).

DESCRIPTION – An annual sedge of up to 20 cm tall; culms solitary to fasciculate; least part of the lateral spikelets individually pedicelled; infloresecence of 2 to 5 dark brown, ovoid to almost cylindrical spikelets; glumes broadly ovate, fimbriate; fruit regularly reticulate.

HABITAT – This sedge prefers sunny, moist habitats, in savannah associated with palms and in grassland with *Bulbine abyssinica*, at 780–850 m altitude.

SEED DISPERSAL – Fair, by adhering to passing animals (epizoochory).

DISTRIBUTION – Only known from the Rusizi Plain, in western Burundi.

RED LIST PARAMETERS – EOO: 26 km²; AOO: 18 km²; Number of locations: 2.

JUSTIFICATION – The extent of occurrence (EOO) falls within the limits for the Critically Endangered category under sub-criterion B1, whereas its area of occupancy (AOO) falls within those for the Endangered category under sub-criterion B2. The species is known from only 7 herbarium specimens collected between 1967 and 1976 and may considered as fairly rare. Unfortunately, all collecting sites lie outside of any protected area in a zone increasingly

◄ ***Bulbostylis nemoides*** – Habit (A, B), inflorescence (C), glume (D), achene (E). Drawing by H. De Pauw, Botanic Garden Meise (©), reproduced from Goetghebeur (1984).

heavy populated. The specific savannah habitat required for the species is being lost and degraded by rapid land conversion for subsistence agriculture, overgrazing and trampling by domestic livestock as well as expanding urbanization. Moreover, hydrocarbons have been found in the Rusizi plain (Brown, 2014) and their extraction will likely lead to even greater biodiversity loss in the area. These adverse factors are affecting the extent and quality of habitat of this restricted-area species and pushing it closer to extinction. By considering the expanding agriculture, the species occurs at 2 locations. Based on the above observations, it is assessed as Endangered (EN).

Bibliography – Brown (2014), Goetghebeur (1984), Goetghebeur & Coudijzer (1985), Ntore & *al.* (2017a33).

Kyllinga chrysanthoides Mtot.

Synonyms – *Cyperus chrysanthoides* (Mtot.) Huygh.

Red List category – **Critically Endangered (Possibly Extinct) (CR (PE))**.

IUCN criteria – B2ab(iii).

Description – A perennial with a short thick sub-erect rhizome covered by old leaf sheaths split into fibres, without stolons; inflorescence a solitary, dense, globose, bright yellow to bright orange head; spikelets uniflorous.

Habitat – It grows in wooded grassland on black cotton soil, at 1900 m altitude.

Seed dispersal – Fair, by adhering to passing animals (epizoochory).

Distribution – Only known from Mumm Hill in southern Burundi. According to Mtotomwema (1990) it is likely to be present in other grassland areas of eastern Africa including the East African Rift Valley grassland, but has never been observed there yet.

Red List parameters – EOO: not applicable; AOO: 9 km^2; Number of locations: 1.

Justification – With only a single collecting site, it is not possible to calculate an Extent of Occurrence (EOO). The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. The species is currently only known from the type specimen collected in 1977, and so it is very rare. Unfortunately, this locality lies outside a protected area, in a zone where the wooded grassland is declining. This decline is driven by rapid extension of agriculture, overgrazing and trampling by livestock as well as planting of exotic tree species. These developments significantly alter the native habitat upon which the species depends. These adverse factors lead us to infer a continuing decline in the extent and quality of habitat and may well already have led to the extinction of the species. Based on the above observations, it is listed as being Critically Endangered (CR), and because of the high risk of it already being extinct or becoming extinct in the near future, it is tagged as Possibly Extinct (PE).

Bibliography – Bauters & *al.* (2014), Beentje & *al.* (2017), Mtotomwema (1990).

► ***Kyllinga chrysanthoides*** – Habit (A, B), spikelet (C), bracteole (D), prophyll (E), achene (F). Drawing by the late Killian Mtotomwema (©), reproduced with permission from Mtotomwema (1990).

Bulbophyllum vulcanicum Kraenzl.

Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(iii).

Description – An epiphytic herb with up to 11 cm between each conical-cylindrical pseudobulb which is enveloped basally by sheaths and which carry 2 oblong leaves of 10–17 × 0.5–3 cm that are present during flowering; inflorescence erect, 18–40 cm long, many-flowered, distichous, with a slightly swollen rachis; each flower subtended by a conspicuous bract.

Habitat – It occurs in mossy forests, at 2000–2400 m altitude.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).

Distribution – Endemic to the Albertine Rift, occurring in north-western Burundi, western Rwanda, eastern Democratic Republic of the Congo, and south-eastern Uganda.

◄ ***Bulbophyllum vulcanicum*** – Photo by Eberhard Fischer (©) taken at Kamiranzovu, Rwanda.

Red List parameters – EOO: 19,245 km²; AOO: 144 km²; Number of locations: 5.

Justification – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1, whereas the area of occupancy (AOO) falls within the thresholds for the Endangered category under sub-criterion B2. The species is represented in herbaria by 27 specimens collected between 1908 and 1994 from 16 different sites and may

be considered as moderately common. Nine of them fall within well-protected areas (the Kibira National Park in Burundi, the Nyungwe National Park in Rwanda, the Kahuzi-Biega National Park and the Virunga National Park in the Democratic Republic of the Congo). Sadly, the Virunga National Park is now confronted with a huge potential threat from pursing plans for oil extraction within and around its boundaries. Three collecting sites lie outside protected areas within zones that are heavily impacted by increasing human activities such as clearing, expanding cultivation crops and livestock farming. As a consequence, many plant species, including orchids, are losing their habitat and are facing threat at alarming rate. These threats lead to infer a continuing decline in the quality of habitat and to estimate the number of locations for this species at 5. Based on the above data, it is listed as Endangered (EN).

Bibliography – Anonymous (2017), Cribb (1984), Fischer & Killman (2008), Fischer *& al.* (2010), Geerinck (1984), Vermeulen (1987).

Habenaria brachylobos (Summerh.) Summerh.

Red List category **Least Concern (Conservation Dependent) (LC (CD))**.

Synonyms – *Peristylus brachylobos* Summerh.

Description A terrestrial orchid of up to 50 cm tall; leaves on stem; inflorescence slender; flowers green, with short sepals and petals of up to 2 × 1 mm, lip inconspicously 3-lobed, spur up to 1 mm long.

Habitat – Montane rainforest, at 2200–2300 m altitude.

► ***Habenaria brachylobos*** – Photos by Eberhard Fischer (©) taken at Gishwati, Rwanda.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).

Distribution – Found in western Burundi, in western Rwanda and in eastern Democratic Republic of the Congo.

Red List parameters –AOO: 2,642 km^2; EOO: 36 km^2; Number of locations: not applicable.

Justification – The extent of occurrence (EOO) falls within the limits for the Endangered category under sub-criterion B1, whereas the area of occupancy (AOO) falls within the thresholds for the Critically Endangered category under sub-criterion B2. The species is known from 4 herbarium specimens collected between 1927 and 2010 and can be considered rare. All collecting localities lie within well-protected areas (theVirunga National Park in the Democratic Republic of the Congo, the Gishwati-Mukura National Park, and the Nyungwe National Park in Rwanda, and the Kibira National Park in Burundi). Given the fact that the plant diversity of these parks has not been subject to human-originated threats, no decline can be identified assumed. Thus, since the required conditions for a threat category have not been met, the species cannot be assessed into any threatened category. Therefore, based on the absence of decline, it is listed as Least Concern (LC). However, considering it is a rare species, which is depending on an effective conservation of its habitat within various National Parks, the label Conservation Dependent (CD) has been added.

Bibliography – Fischer & *al.* (2010), Geerinck (1984).

Habenaria coeloglossoides Summerh.

Red List category – **Least Concern (Conservation Dependent) (LC (CD))**.

Synonyms - *Kryptostoma coeloglossoides* (Summerh.) Szlach., *Pseudocoeloglossum coeloglossoides* (Summerh.) Szlach.

Description – A terrestrial orchid of up to 15–45 cm tall; leaves 4 to 7, lanceolate, acute, up to 14 × 2.5 cm; inflorescence 5–11 cm long, lax, with 5 to 20 flowers; flowers yellowish to green; dorsal sepal ovate, obtuse, 7–8 × 4.5–6 mm, lateral sepals deflexed, narrower; petals ovate, 7–8 mm long, lip 3-lobed, 11–15 mm long, lobes narrow, the lateral lobes longer than the median one, spur 7–10 mm long.

Habitat – It grows in alpine grassland, in Ericetum vegetation, at 2500–3500 m altitude.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, south-western Rwanda, eastern Democratic Republic of the Congo and south-western Uganda.

Red List parameters – EOO: 13,017 km^2; AOO: 54 km^2; Number of locations: not applicable.

Justification – The extent of occurrence (EOO) falls within the limits for the Vulnerable category under sub-criterion B1, whereas the area of occupancy (AOO) falls within the thresholds for the Endangered category under sub-criterion B2. The species is represented in herbaria by 9 specimens collected between 1929 and 1994 and should be considered as rare. All collecting localities lie within well-protected areas (the Kibira National Park in Burundi, the Nyungwe National Park in Rwanda, the Kahuzi-Biega National Park in the Democratic Republic of the Congo, and the Bwindi Impenetrable National Park in Uganda). Given the

◄ ***Habenaria coeloglossoides*** – Photos by Michel Arbonnier (c) taken at Kibira National Park, Burundi.

fact that the plant diversity of these parks has not been subject to human-originated threats, no decline can be assumed. Thus, since the required conditions have not been met, the species cannot be assessed into any threat category. Therefore, based on the absence of decline, the species is listed as Least Concern (LC). However, considering it is a rare species, which is depending on an effective conservation of its habitat within various National Parks, the label Conservation Dependent (CD) has been added.

Bibliography – Fischer & *al.* (2010), Geerinck (1984).

Habenaria lewallei Geerinck

Red List category – **Critically Endangered (Possibly Extinct) (CR (PE))**.

IUCN criteria – B2ab(iii,v).

Description – A terrestrial herb of 15–25 cm tall, with a subterranean tubercle; leaf 1, appressed to the soil, subcircular, cordate at base; inflorescence lax, densely pilose, with 2 to 5 flowers; flowers white, petals bipartite, lip tripartite, spur pendant, slightly thickened at apex, glabrous, up to 13 mm long; ovary densely pilose.

Habitat – It occurs in a small valley, at 1000 m altitude.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).

Distribution – Endemic to the Rusizi Plain in western Burundi.

Red List parameters – EOO: Not applicable; AOO: 9 km²; Number of locations: 1.

JUSTIFICATION – With only one site where *H. lewallei* has been observed, it is not possible to calculate its extent of occurrence (EOO). The area of occupancy (AOO) meets the threshold for the Critically Endangered category (CR) under sub-criterion B2. The species is only known from the type specimen collected in 1970 in the Katunguru Valley and should be considered as very rare. This locality lies outside protected areas and is heavily impacted by human population pressure which has drastically increased over the last 20 years. Activities such as cattle grazing, cultivation and others related with human inhabitance, have had an important and negative influence on the habitat. A sclerophyllous forest relic of *Euphorbia dawei* which was located in the Katunguru Valley has been entirely destroyed to make way for crop cultivation. Furthermore, oil exploration could restart in the near future (Becker & *al.*, 2010). This environmental degradation of the area leads us to infer a quick continuing decline in the quality of habitat and number of mature individuals. Hence, based on the above observations, the species has been listed as Critically Endangered (CR). Because it seems probable that the species is in fact already extinct, the label Possibly Extinct (PE) has been added.

NOTE – Geerinck (1984) mentions two more specimens belonging to this species: Lisowski 66148 and Lisowski, Malaisse & Symoens 3178, both collected in Upper Katanga. However, these turned out to represent a different species, *H. robbrechtsiana* Geerninck & Schaijes, which occurs on Katangan copper sites.

BIBLIOGRAPHY – Becker & *al.* (2010), Geerinck (1977, 1984).

◄ ***Habenaria lewallei*** – Flowering plant (A), flower (B). Drawing by Danièle Coutrez, Botanic Garden Meise (©), reproduced from Geerinck (1977, 1984).

Polystachya cribbiana Geerinck

RED LIST CATEGORY - **Least Concern (Conservation Dependent) (LC (CD))**.

DESCRIPTION - An epiphytic orchid of up to 40 cm tall; leaf oblong, obtuse, 13–17 × 0.3–0.5 cm; inflorescence paniculate, with few branches and 15 to 20 flowers, 12–15 cm long, equalling the leaf; flowers yellowish spotted with purple, 5–7 mm in diameter; dorsal sepal elliptic, subacute, 5 × 1.5 mm, lateral sepals ovate, obtuse, 4 × 4 mm; petals obovate, 3.5 × 10 mm, lip 3 × 3 mm, sessile, distinctly 3-lobed at apex, lateral lobes rounded, median lobe linear and reduced to a short point, equalling the lateral ones.

HABITAT – It occurs in montane forest, at 2300–2400 m altitude.

SEED DISPERSAL – Effective, tiny seeds are dispersed by wind (anemochory).

DISTRIBUTION – Endemic to the Albertine Rift, occurring in north-western Burundi, southern Rwanda and eastern Democratic Republic of the Congo.

► ***Polystachya cribbiana*** – Photos by Eberhard Fischer (©) taken at Rugera, Rwanda.

RED LIST PARAMETERS – EOO: 71 km²; AOO: 27 km²; Number of locations: Not applicable.

JUSTIFICATION – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits for the Endangered category under sub-criteria B1 and B2. The species is represented in herbaria by only 4 specimens collected between 1956 and 1991, and should be considered as very rare. Fortunately, all collecting sites fall within well-protected areas (the Kibira National Park in Burundi, the Nyungwe National Park in Rwanda, and the Kahuzi-Biega National Park in the Democratic Republic of the Congo). Even though the EOO and the AOO meet the thresholds for the Endangered category, there is no evidence

for any significant threat enough to warrant concern for the species. Thus, since the species is not known to be declining, it cannot be accommodated within any threat category. Hence, it is rated as Least Concern (LC). However, considering it is a very rare species, which is depending on an effective conservation of its habitat within various National Parks, the label Conservation Dependent (CD) has been added.

BIBLIOGRAPHY – Geerinck (1984), Mytnik-Ejsmont (2011).

Polystachya editae Eb.Fisch., Killmann, Lebel, Delepierre & Nzigidahera

RED LIST CATEGORY – **Critically Endangered (CR)**.

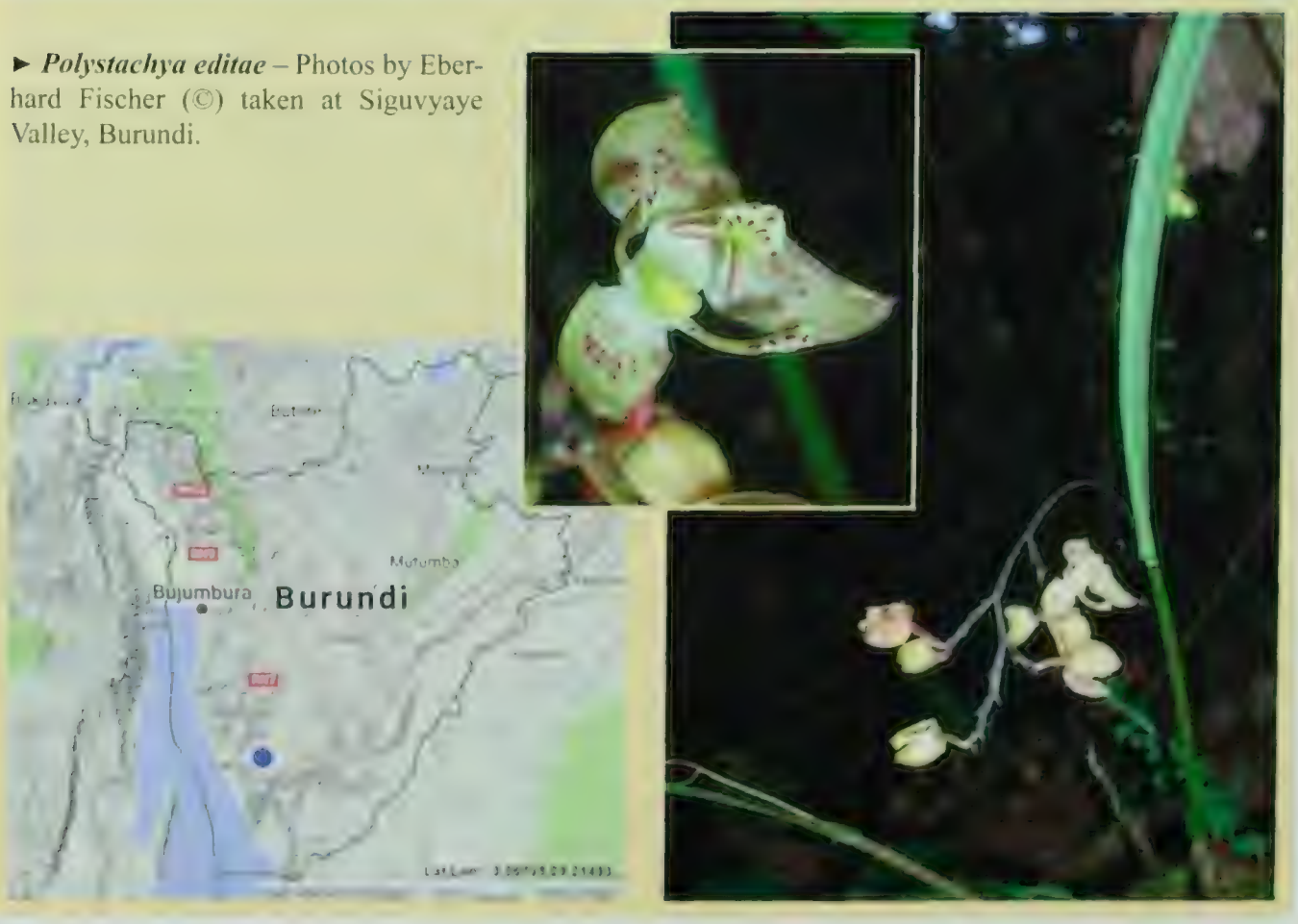
IUCN CRITERIA – B2ab(iii).

DESCRIPTION – An epiphytic orchid of up to 35 cm tall; pseudobulbs narrowly cylindric, with 1 leaf; blade elongate-lanceolate, 15–19 × 1.2–1.5 cm, acute; inflorescence racemose, with 1 to 4 lateral branches, shorter than the leaf, up to 15 cm long; flowers 1.4–1.5 cm in diameter, light brown to cream with dark purple spots, lip distinctly 3-lobed, tinged purple at base, apical part cream with purple spots, 2 × 2.2 mm, apex rounded-ovate, base with 2 wings, 3 × 5 mm.

HABITAT – It grows in gallery forest, at ±1770 m altitude.

SEED DISPERSAL – Effective, tiny seeds are dispersed by wind (anemochory).

► ***Polystachya editae*** – Photos by Eberhard Fischer (©) taken at Siguvyaye Valley, Burundi.



Distribution – Only known from the Siguvyaye Valley in southern Burundi.

Red List parameters – EOO: not applicable; AOO: 9 km^2; Number of localities: 1.

Justification – With only two collecting sites where the species has been observed, it is not possible to calculate its extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. The species is represented in herbaria by three specimens collected in two sites between 1974 and 2013 and can be considered as very rare. Both sites are in close proximity and fall in the forest periphery of a protected area (the Bururi Forest Nature Reserve). This periphery is under great pressure from the surrounding population growth which has increased the demand for resources and activities such as grazing by cattle, deliberate bush-fires for regenerating grass and collecting of fuel-wood, consequently leading to a massif encroachment into the protected areas and a significantly damage to the biota associated with the forest, in particular to the hosts and epiphytic orchids they support. These threats indicate that the species, which could also be threatened by illegal collecting due to its highly attractive flowers, is facing an extremely high risk of extinction in the wild. The species is considered as Endangered by Fischer & *al.* (2016). However, given the very restricted area of occupancy, combined with the high level of threats, *P. editae* should be listed as Critically Endangered (CR).

Bibliography – Fischer & *al.* (2016).

Polystachya fallax Kraenzl.

Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(iii).

Description – An epiphytic or rarely lithophytic orchid of up to 20 cm tall; pseudobulbs conical, 2.5–5 cm long, with 1 leaf; blade oblong, 9–12 cm long, acute or obtuse; inflorescence shorter than leaf, simple, 4–5 cm long, with 3 to 5 flowers; flowers white with yellow, 0.7–1.2 cm long; sepals and petals acuminate, dorsal sepal ovate-lanceolate, 7.5–11 × 3 mm, lateral sepals narrowly triangular; petals linear-lanceolate, 6.5–8 × 1–2 mm, lip 3-lobed, strongly recurved, up to 12 × 6 mm, with a longitudinal central fleshy callus on the central lobe.

Habitat – It occurs in montane forest, at 2000–2595 m altitude.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, south-western Rwanda, eastern Democratic Republic of the Congo and western Uganda.

Red List parameters – EOO: 27,373 km^2; AOO: 117 km^2; Number of locations: 5.

Justification – The extent of occurrence (EOO) exceeds the upper limit for a threat category under sub-criterion B1, whereas the area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. It has a representation of 16 herbarium specimens collected between 1905 and 1992 and can be considered as fairly rare. Several collecting sites lie within protected areas (the Nyungwe National Park in Rwanda, the Kahuzi-Biega National Park and the Virunga National Park in the Democratic Republic of the Congo, and the Bwindi Impenetrable National Park in Uganda). One site is situated between the Ruwenzori Mountains National Park and the Kibale Forest National Park in Uganda wherein it is likely

to be present as well. The other ones lie outside protected areas where natural forests have been drastically and adversely affected by human activities. Due to increasing human population and expansion of activities such as gold mining, logging, and others related with human inhabitance, many plant species including host trees for epiphytic orchids are facing threats and are decreasing at alarming rate. This habitat destruction leads us to estimate the number of locations for the species at 5 and to infer a decline in EOO, and in quality and extent of the habitat. Therefore, based on the above information, the species is listed as Endangered (EN).

BIBLIOGRAPHY – Fischer & Killman (2008), Fischer & *al.* (2010), Geerinck (1984), Mytnik-Ejsmont (2011).

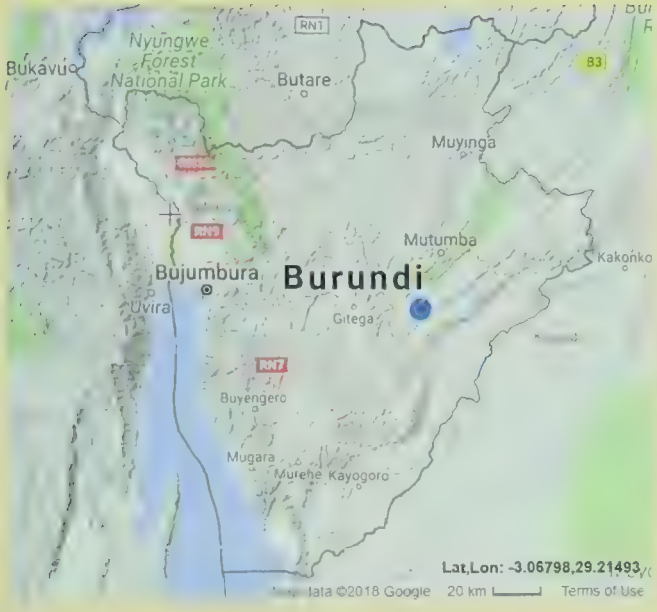
▲ ► ***Polystachya fallax*** – Photos by Eberhard Fischer (©) taken at Mount Bigugu, Rwanda.

Polystachya lacroixiana Geerinck

RED LIST CATEGORY – **Critically Endangered (CR)**.

IUCN CRITERIA – B2ab(iii).

DESCRIPTION – An epiphyte of up to 4 cm tall; pseudobulbs ovoid; blades filiform, not present when in flower; inflorescence a terminal 6- to 12-flowered raceme; flowers yellow-greenish, sometimes with red spots, ± 5 mm in diameter; lip appearing 4-lobed with median lobe largely bifid



► ***Polystachya lacroixiana*** – Photo by Michel Arbonnier (©) taken at Butezi, Burundi.

HABITAT – It occurs in gallery forest, at ± 15500 m altitude.

SEED DISPERSAL – Effective, tiny seeds are dispersed by wind (anemochory).

DISTRIBUTION – Only known from eastern Burundi.

RED LIST PARAMETERS – EOO: not applicable; AOO: 9 km²; Number of locations: 1.

JUSTIFICATION – With only one collecting site where *P. lacroixiana* has been observed, it is not possible to calculate an extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. This species is known from only two herbarium specimens collected in 1992, and can be considered as very rare. Unfortunately, the single collecting locality lies outside any protected area in a zone increasingly densely populated which results in expansion of agriculture and habitat becoming heavily disturbed and degraded. Due to increasing human activities such as cattle grazing, logging, and others related with human inhabitancy, many plant species including orchids are facing threats at alarming rate and their populations are gradually decreasing. The gallery forests, whose main enemy in the region is fire and the axe, are threatened by conversion into agricultural land and wood harvesting to fuel cooking fires. These threats lead us to presume a rapid continuing decline in habitat quality. Therefore, based on the above information, the species has been classified as Critically Endangered (CR).

BIBLIOGRAPHY – Geerinck (1994), Mytnik-Ejsmont (2011), Ntore & *al.* (2017a51).

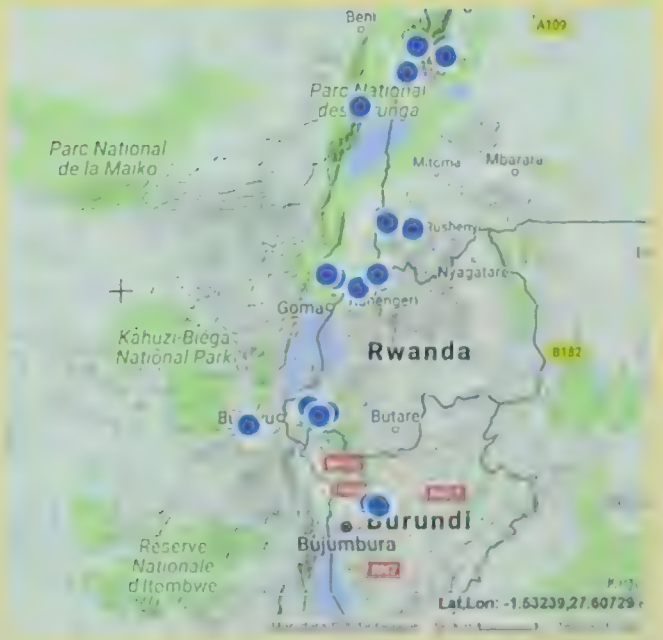
Polystachya leucorhoda Kraenzl.

Red List category – **Vulnerable (VU).**

IUCN criteria – B2ab(ii,iii,iv,v).

Synonyms - *Polystachya poikilantha* Kraenzl. var. *leucorhoda* (Kraenzl.) P.J.Cribb & Podz.

Description – An epiphytic orchid of up to 30 cm tall, with 1 leaf; blade oblong, 12–22 × 0.7–1.5 cm, acute; inflorescence paniculate, shorter than leaf, 8–20 cm long, with up to 50 flowers; flowers 6–10 mm in diameter, pale green or cream, with reddish-purple lines or spotted or flushed purple; dorsal sepal triangular-ovate, 6–8.5 × 2–3.5 mm, lateral sepals spreading, rounded-triangular, 6–8.5 × 3.7–5.2 mm; petals oblanceolate, 4.5–8 × 1.5–2.5 mm, lip subsessile, 5–7 × 3–5 mm, reddish-purple, 3-lobed in upper third, median lobe ovate, without longitudinal furrow.



◄ ***Polystachya leucorhoda*** – Photo by Eberhard Fischer (©) taken at Mount Kahuzi, Democratic Republic of the Congo.

Habitat – It grows in gallery forests and montane forests, at 1800–2800 m altitude.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, south-western Rwanda, eastern Democratic Republic of the Congo and south-western Uganda.

Red List parameters – EOO: 33,093 km²; AOO: 144 km²; Number of locations: 9

Justification – The extent of occurrence (EOO) exceeds the upper limit of the threat categories under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. It is known from 23 herbarium specimens collected between 1933 and 1979 and can be considered as fairly common. Several collecting sites lie within protected areas such as the Kibira National Park in Burundi, the

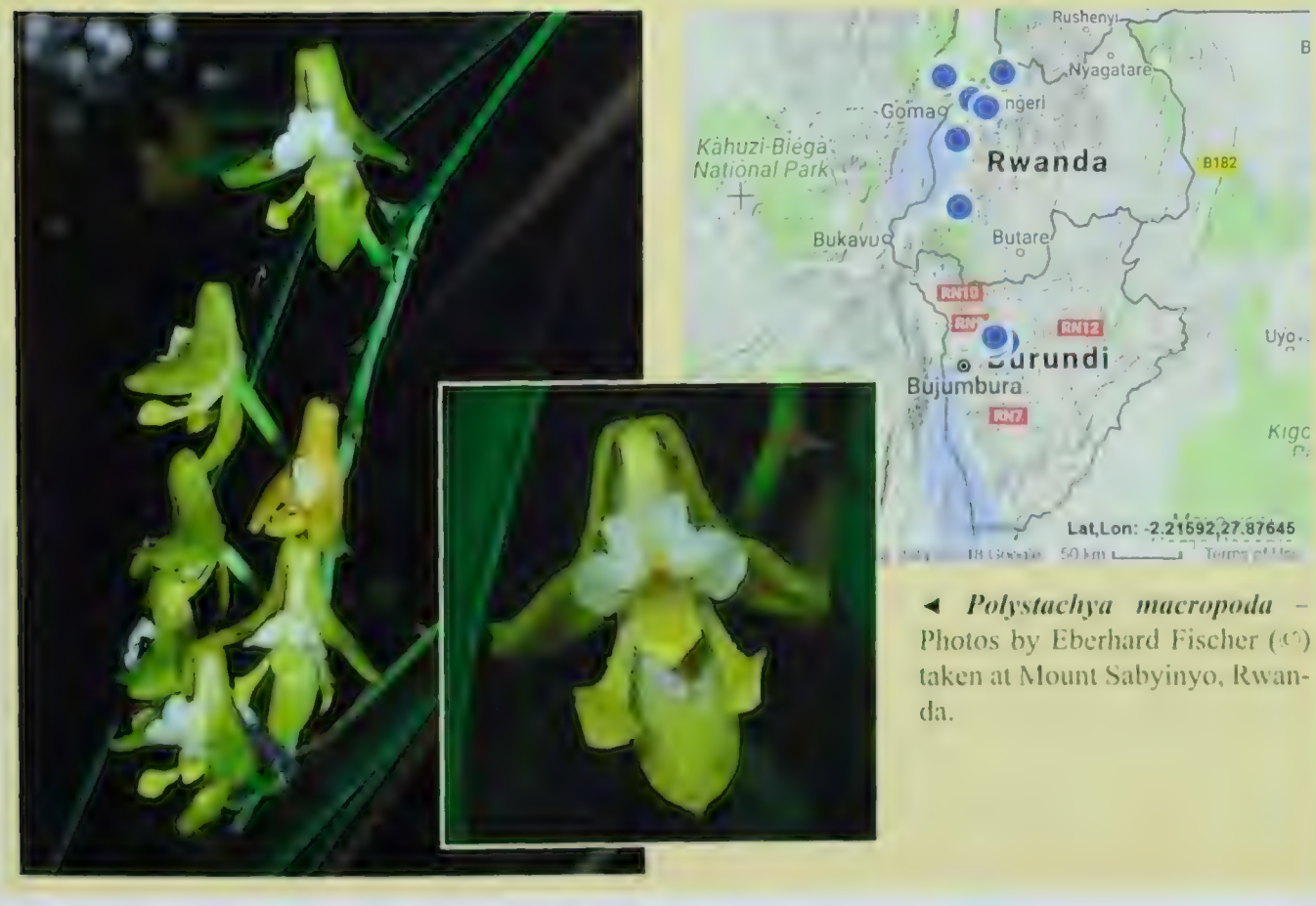
Nyungwe National Park in Rwanda, the Kahuzi-Biega National Park and the Virunga National Park in the Democratic Republic of the Congo and the Bwindi Impenetrable National Park in Uganda. Some others lie outside protected areas where they are under human pressure. Due to increasing human activities carried out in the region, such as cattle grazing, forest clearing, logging, charcoal production and others related to human inhabitancy, many plant species including orchids are facing huge threats. This habitat loss, which has a negative impact on large host trees of epiphytic orchids, leads to estimate the number of locations for the species to 9. It also leads to infer a continuing decline in AOO, quality of habitat, number of locations and number of mature individuals. Based on the above information, the species is rated as Vulnerable (VU).

Bibliography – Cribb & Podzorski (1979), Fischer & Killman (2008), Fischer & *al.* (2010), Geerinck (1984), Mytnik-Ejsmont (2011).

Polystachya macropoda Summerh.

Red List category – **Least concern (Conservation Dependent) (LC (CD))**.

Description – An epiphytic or occasionally terrestric orchid of up to 20 cm tall, with 1 leaf; blade oblong, 10–15 × 4–7.5 cm, obtuse; inflorescence paniculate or racemose, shorter than the leaf, 5–10 cm long, with up to 25 flowers; flowers yellowish or yellow, with purple or maroon spots, 8–10 mm in diameter; dorsal sepal elliptic, 7–8 × 2 mm, acute; lateral sepals oblong, 7–8 × 2.5 mm, acute; petals spathulate, 5–6 × 1.5 mm; lip subsessile, 8–10 × 3–5 mm, 3-lobed, with inconspicuous longitudinal furrow.



◄ ***Polystachya macropoda*** – Photos by Eberhard Fischer (©) taken at Mount Sabyinyo, Rwanda.

Habitat – It occurs in the undergrowth of montane forests, between 2000 and 2700 m altitude.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, western Rwanda and eastern Democratic Republic of the Congo.

Red List parameters – EOO: 6,177 km^2; AOO: 99 km^2; Number of locations: not applicable.

Justification – The extent of occurrence (EOO) falls within the limits of the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits of the Endangered category under sub-criterion B2. It is represented in herbaria by 11 specimens collected between 1900 and 1969 and should be considered as fairly rare. All collecting localities lie within well-protected areas (the Kibira National Park in Burundi, the Gishwati-Mukura National Park and the Nyungwe National Park in Rwanda, the Virunga National Park in the Democratic Republic of the Congo) where the habitat is presumed to be intact. Despite the fact that the Virunga National Park is confronted with a potentially big threat from pursing plans for oil extraction, at present, no major threat is known to affect the species. Since the conditions required to assign a category of threat are not filled, the species is listed as Least Concern (LC).

Bibliography – Anonymous (2017), Fischer & *al.* (2010), Mytnik-Ejsmont (2011).

Polystachya maculata P.J.Cribb

Red List category – **Critically Endangered (CR)**.

IUCN criteria – B2ab(iii).

Description – An epiphytic orchid of up to 25 cm tall; pseudobulbs ovoid or cylindrical, carrying a single apical leaf; blade oblong or obovate, acute, with erose margins; inflorescence terminal, pending, up to 15 cm long; flowers up to 2 cm in diameter, yellowish or greenish with external purple dots; lip whitish, obscurely 3-lobed at apex, at base with a longitudinal crest.

Habitat – It occurs in primary forests, at ± 1500 m altitude.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).

Distribution – Only known from south-western Burundi.

Red List parameters – EOO: not applicable; AOO: 9 km^2; Number of locations: 1.

Justification – With only two georeferenced collecting sites where *P. maculata* has been observed, it is not possible to calculate its extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. This species is represented by only three herbarium specimens collected between 1982 and 1991 very close to each other, indicating it is very rare in the wild. The herbarium specimens mention three localities, but the type one is not accurately known and may actually be from the same as one of the others. The two known collecting sites lie at the edge of the Burun Forest Nature Reserve, where human population growth is putting pressure on the natural habitat through pastoral activities, deliberate lighting of bushfires and wood harvesting for cooking fires. These activities have a negative impact on biodiversity including the

availability of host trees that can support epiphytic orchids. The ongoing habitat loss leads us to infer a continuing decline in extent and quality of habitat. Moreover, this species could be subject to excessive collecting by orchid collectors due to its highly attractive flowers. It is commonly cultivated in Europe as an ornamental plant. In all, the species has been classified as Critically Endangered (CR).

Bibliography – Mytnik-Ejsmont(2011), Ntore & *al.* (2017a52).

► ***Polystachya maculata*** – Photos by Eberhard Fischer (©) taken at Siguvyaye Valley, Burundi.

Polystachya stauroglossa Kraenzl. var. *alata* Geerinck

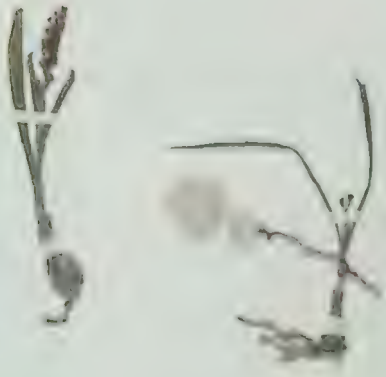
Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(ii,iii,iv).

Description – An epiphytic orchid with aggregated stems of 17–75 cm tall. This taxon differs from typical var. *stauroglossa* in the lip that is 4 mm long and 6.5 mm wide, with transversally triangular lateral lobes and a triangular median one.

Habitat – This variety occurs in high altitude steppe, at ± 2400 m altitude.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).



► ***Polystachya stauroglossa* var. *alata*** – Scan of a paratype specimen (Arbonnier 337) and distal part of the labellum. Drawing by Antonio Fernandez, Botanic Garden Meise (©), reproduced from Arbonnier & Geerinck (1993).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi.

Red List parameters – EOO: not applicable; AOO: 18 km²; Number of locations: 2.

Justification – While the species has a much wider distribution, this variety is known from only two collecting sites. Because of that, its extent of occurrence (EOO) cannot be calculated. The area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. This variety is represented in herbaria by two specimens collected in 1991 and 1992 and can be considered as very rare. One of the two collecting localities is situated within a protected area (the Kibira Natural Park), where the habitat is safe. The other one is located in a non-protected area, in a zone where relict natural gallery forests are doomed to the machete for clearing for fire wood harvesting and to give way to crop cultivation. The loss of habitat leads us to assess the number of locations for the taxon at 2; it also leads to infer an ongoing decline in extent and quality of habitat, number of mature individuals, and hence in AOO. Therefore, based on all the information above, this variety should be classified as Endangered (EN).

Note – The species comprises two varieties, and as a whole occurs from Cameroon and the Democratic Republic of the Congo towards Uganda and Tanzania. Its EOO, AOO and number of locations are far exceeding the upper limits for any IUCN threat category. Therefore, the species has been classified as Least Concern (LC).

Bibliography – Ntore & *al.* (2017a53), Mytnik-Ejsmont (2011).

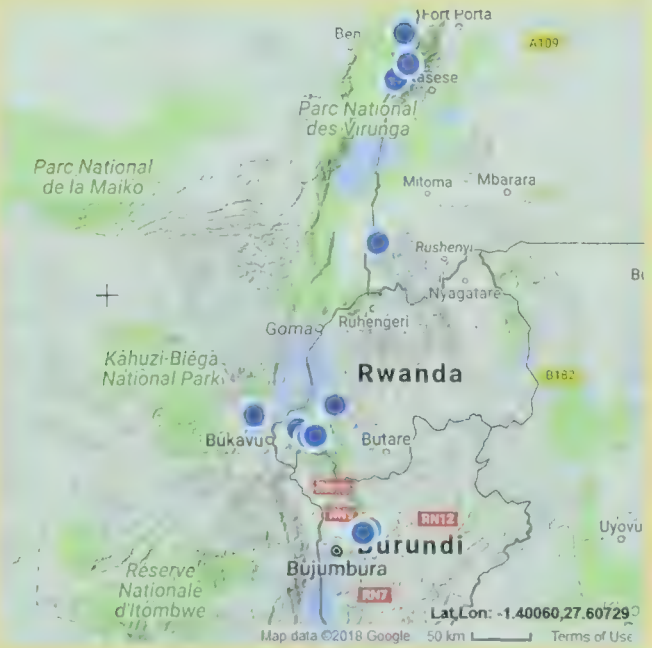
Polystachya tridentata Summerh.

Red List category – **Least Concern (Conservation Dependent) (LC (CD))**.

Synonyms – *Polystachya ruwenzoriensis* Rendle var. *tridentata* (Summerh.) Geerinck.

Description – A small epiphytic or lithophytic orchid with rounded pseudobulbs, each with 2 leaves; stems up to 30 cm long; blade ovate, 3.3–10 × 0.5–1.1 cm, acuminate at apex; inflorescence with 3 to 9 flowers; flowers brownish with white lip bearing a yellow dot, densely hairy outside, up to 1.8–2 cm in diameter; dorsal sepal broadly lanceolate, 6 × 3 mm; lateral sepals lanceolate-triangular, 9 × 6 mm; petals oblanceolate, 5 × 1.5 mm, lip 7–9 × 4.5 mm, with a long claw; callus fleshy, with 3 teeth.

▲ ***Polystachya tridentata*** – Photo by Eberhard Fischer (©) taken at Uwinka, Rwanda.



Habitat – It occurs in montane forest and in open vegetation, at 1900–2700 m altitude.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, south-western Rwanda, eastern Democratic of the Congo and south-western Uganda.

Red List parameters – EOO: 23,851 km^2; AOO: 108 km^2; Number of locations: not applicable.

Justification – The extent of occurrence (EOO) exceeds the upper limit for the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is represented in herbaria by 18 specimens collected between 1948 and 1991 and should be considered as fairly rare. All collecting localities lie within protected areas (the Kibira National Park in Burundi, the Gishwati-Mukura National Park and the Nyungwe National Park in Rwanda, the Virunga National Park in the Democratic Republic of the Congo, and the Bwindi Impenetrable Forest in Uganda) where the habitat is presumed to be intact. As apart from the big potential threat which the Virunga National Park is facing (concerning potential oil exploration, see above), no major threats are known to affect the species at present, and the population is believed to be stable. Thus, since the conditions required to assign a category of threat are not met, the species

is rated as Least Concern (LC). However, since it is depending upon an effective management within the various protected areas, the label Conservation Dependent (CD) has been added.

BIBLIOGRAPHY – Anonymous (2017), Fischer & *al.* (2010), Geerinck (1984), Mytnik-Ejsmont (2011).

Polystachya undulata P.J.Cribb & Podz.

RED LIST CATEGORY – **Endangered (EN)**.

IUCN CRITERIA – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

DESCRIPTION – An epiphytic orchid of up to 20 cm tall; pseudobulbs 4–5 × 1–1.5 cm, with 1 leaf at apex; blade glaucous, oblong to ovate, 8–10 × 4 cm, with auriculate to cordate base, acute at the apex; inflorescence a raceme or panicle, with spike-like branches and 15 to 20 flowers, 8–10 cm long; flowers pink to white with orange mark on lip, 5–7 mm in diameter.

HABITAT – It occurs in highland forest, at 1500–1700 m altitude.

▲ ***Polystachya undulata*** – Photo by Joice Stewart, Kew Bulletin (©), reproduced with permission from Podzorski & Cribb (1979).

SEED DISPERSAL – Effective, tiny seeds are dispersed by wind (anemochory).

DISTRIBUTION – Endemic to the Albertine Rift where it is only known from north-western Burundi, south-western Rwanda and eastern Democratic Republic of the Congo.

RED LIST PARAMETERS – EOO: 867 km²; AOO: 27 km²; Number of locations: 3

JUSTIFICATION – The extent of occurrence (EOO) and the area of occupancy (AOO) both comply with the criteria for the Endangered category under sub-criteria B1 and B2. This species is represented in herbaria by 4 specimens recorded between 1955 and 1992 from 3 different sites and should thus be considered as very rare. One of the three collecting sites lies inside a well-protected area (the Nyungwe National Park in Rwanda). The two other ones lie outside protected areas in small highland forest patches. Here, the main threat comes from deforestation for conversion to pasture and for fire wood harvesting, expansion of agriculture, and gold mining, also affecting the host plants. The ongoing loss of hosts leads us to estimate

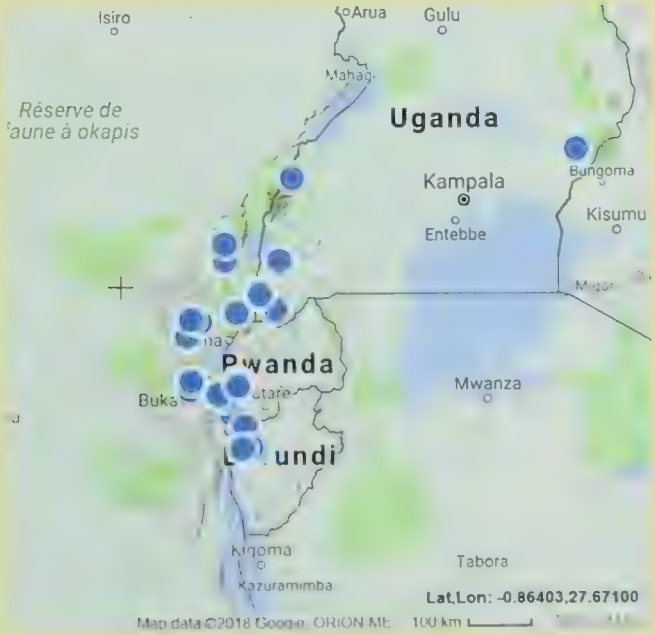
the number of locations for the species at 3. It also leads us to infer a continuing decline in number of locations and mature individuals, and of its EOO and AOO. Based on the above observations, the species is classified as Endangered (EN).

Bibliography – Cribb & Podzorski (1978), Fischer & *al.* (2010), Geerinck (1984), Mytnik-Ejsmont (2011), Ntore & *al.* (2017a54).

Polystachya virginea Summerh.

Red List category – **Least Concern (LC)**.

Description – An epiphytic orchid of up to 37 cm tall, with 1 leaf; blade lanceolate, 8–25 cm long, cuneate at base, obtuse at the top; inflorescence shorter than the leaf, simple, racemose, 4–9 cm long, with up to 10 flowers; flowers white, 1.4–2.4 cm long; dorsal sepal ovate-triangular, 8.5–12 × 4.5–7.5 mm; lateral sepals similar, 8.5–12 × 4.5–9.5 mm; petals elliptic to ovate, 8–13 × 3–4.5 cm; lip 3-lobed, strongly recurved, 11–15 × 8.5–11 mm, median lobe with central fleshy callus.



◄ ***Polystachya virginea*** – Photo by Eberhard Fischer (♀) taken at Uwinka, Rwanda.

Habitat – It occurs in montane forest, at 1870–2800 m altitude.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).

Distribution – Near endemic to the Albertine Rift, occurring in western Burundi, south-western Rwanda, eastern Democratic Republic of the Congo and in both western and eastern Uganda

Red List parameters – EOO: 168,895 km²; AOO: 243 km²; Number of locations: 14.

JUSTIFICATION – The extent of occurrence (EOO) is exceeding the upper limits for the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is currently known from 26 herbarium specimens collected between 1967 and 1984, and may be considered as moderately common. Most of the collecting sites fall within various protected areas across its range (the Kibira National Park and the Ruvubu National Park in Burundi, the Nyungwe National Park in Rwanda, the Kahuzi-Biega National Park and the Virunga National Park in the Democratic Republic of the Congo, the Mount Elgon National Park in Uganda, the Semuliki National Park, the Kigezi Game Reserve and the Bwindi Impenetrable National Park in Uganda). However, the Virunga National Park may be at risk from future oil exploitation. Two collecting sites lie outside protected areas in zones increasingly impacted by human activities. On the other hand, the species exists at 14 locations (exceeding the upper limit of 10 for the Vulnerable category). In conclusion, the species does not qualify for any threat category and hence it is assessed as Least Concern (LC).

BIBLIOGRAPHY – Anonymous (2017), Fischer & Killman (2008), Fischer & *al.* (2010), Geerinck (1984), Mytnik-Ejsmont (2011).

Polystachya virginea Summerh. var. ***parva*** Geerinck

RED LIST CATEGORY – **Least Concern (Conservation Dependent) (LC (CD))**.

DESCRIPTION – It is one of the two varieties which compose the species *Polystachya virginea*. It differs from var. *virginea* in the narrower pseudobulbs, 3–7 mm in diameter, the narrower leaves, 3–12 mm wide, the lip being ± 8 × 4 mm, slightly 3-lobed with a triangular median lobe.

HABITAT – It occurs in forest, at 2200 m altitude.

SEED DISPERSAL – Effective, tiny seeds are dispersed by wind (anemochory).

DISTRIBUTION – Endemic to the Congo-Nile Divide, in western Burundi and south-western Rwanda.

RED LIST PARAMETERS – EOO: not applicable; AOO: 18 km²; Number of locations: not applicable.

JUSTIFICATION – With only two collecting sites where the species has been observed, it is not possible to calculate an extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. This variety is known from 2 herbarium specimens collected in 1990 and 1992 indicating it is very rare in the wild. The two collecting sites are inside protected areas (the Kibira National Park in Burundi and the Nyungwe National Park in Rwanda). At present, no significant threat to warrant concern for this taxon can be identified and hence it cannot be assessed into any threat category. Therefore, based on the above information, this variety has been assessed as Least Concern (LC). However, since it is depending upon an effective management within the protected area, the label Conservation Dependent (CD) has been added.

BIBLIOGRAPHY – Arbonnier & Geerinck (1993), Geerinck (1992), Mytnik-Ejsmont (2011), Ntore & *al.* (2017a55).

◄ ***Polystachya virginea* var. *parva*** – Scan of the holotype specimen (Arbonnier 123) with photo at BR.

Polystachya walravensiana Geerinck & Arbonn.

Red List category – **Least Concern (Conservation Dependent) (LC (CD))**.

Description – An epiphytic orchid of up to 25 cm long, with 1 leaf; blade oblong, 15 × 0.6–0.7 cm, obtuse at the apex; inflorescence with up to 10 flowers; flowers tricolourous, up to 6 mm in diameter; sepals yellowish; petals whitish, lip white at base, pinkish at apex, glabrous, indistinctly 3-lobed.

Habitat – It occurs in highland forest, at 2200 m altitude.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).

Distribution – Endemic to the Congo Nile Devide, occurring in western Burundi.

Red List parameters – EOO: not applicable; AOO: 9 km²; Number of locations: not applicable.

Justification – With only one collecting site where the species has been observed, it is not possible to calculate an extent of occurrence (EOO). The area of occupancy (AOO) falls within the limits for the Critically Endangered category under sub-criterion B2. It is only known from two specimens collected in 1993 and 1994, indicating it is very rare in the wild. However, as the single collecting site occurs inside a well-protected area (the Kibira National Park), which provides protection, it has to be assumed it does not face degradation or loss of habitat and is not in decline. Thus, the necessary conditions required under sub-criterion B2

► ***Polystachya walravensiana*** – Photos by Eberhard Fischer (©) taken at Kimihurura, Rwanda.

are not met, and the species cannot be assessed into any threat category. Therefore, based on the above observations, it is listed as Least Concern (LC), but because its entire occurrence is within a protected area, the label Conservation Dependent has been added (CD).

Bibliography – Geerinck & Arbonnier (1996), Mytnik-Ejsmont (2011).

Polystachya woosnamii Rendle var. *woosnamii*

Red List category – **Vulnerable (VU)**.

IUCN criteria – B2ab(ii,iii,iv,v).

Description – An epiphytic or lithophytic plant, 11–30 cm tall, glabrous.

Habitat – It occurs in montane and riverine forest, at 1800–2700 m altitude.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, western Rwanda, eastern Democratic Republic of the Congo, and south-eastern Uganda.

Red List parameters – EOO: 30,619 km^2; AOO: 180 km^2; Number of locations: not applicable.

Justification – The extent of occurrence (EOO) is exceeding a bit the limits for the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is currently represented in herbarium by 25 specimens collected between 1914 and 2000, and could be considered as moderated common. Ten collecting sites lie within protected areas (the Kibira National Park in north-western Burundi, the Kahuzi-Biega National Park, the Virunga National Park in eastern Democratic Republic of the Congo, the Volcanoes National Park and the Gishwati-

Mukura National Park in north-western Rwanda, the Bwindi Impenetrable National Park in south-western Uganda, and the Mgahinga Gorilla National Park in south-western Uganda. However, the Virunga National Park should be at risk from the exploration plans of oil companies. The other ones lie outside protected areas where the remnant forest patches are cleared to make way for crop cultivation and for fire wood harvesting. As a consequence of the loss of this biota, we conclude the species faces a decline. The various threats lead to the estimation of 8 locations for this species and to infer a decline in number of mature individuals, EOO, AOO, quality of habitat and number of locations. Therefore, based on the above information, the variety has been listed as Vulnerable (VU).

▲ ***Polystachya woosnamii* var. *woosnamii*** – Photos by Eberhard Fischer (©) taken at Mount Bigugu (flowers) and the Musizi Swamp (plant), Rwanda.

Note – This concerns one of the two varieties of the species *P. woosnamii*. The other variety, var. *nyungwensis* Delep. & J.-P.Lebel, is endemic to Rwanda. The species as a whole, which has the same distribution as its var. *woosnamii*, has also been assessed as Vulnerable (VU).

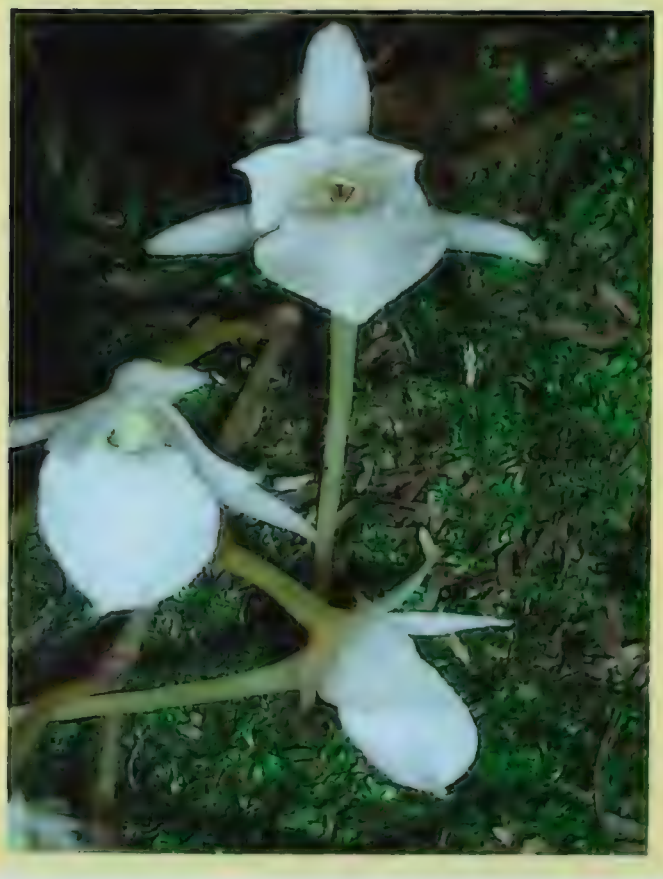
Bibliography – Anonymous (2017), Fischer & Killmann (2008), Fischer & *al.* (2010), Geerinck (1984), Mytnik-Ejsmont (2011).

Rhipidoglossum arbonnieri (Geerinck) Eb.Fisch., Killmann, J.-P. Lebel. & Delep.

RED LIST CATEGORY – **Least Concern (Conservation Dependent) (LC (CD))**.

SYNONYMS – *Diaphananthe arbonnieri* Geerinck, *Ypsilopus liae* Delep. & J.-P.Lebel.

DESCRIPTION – An epiphytic orchid with stem up to 2 cm long, covered with old leaf-sheaths; leaves distichous, 10–16 × 0.6–1.1 cm, slightly bilobed at apex; inflorescence pendent, 10–30 cm long, with 2 to 17 flowers; flowers white, up to 1.4 cm long; lower lip rounded, up to 9 × 8 mm, mucronate at apex; spur up to 3 cm long.



◄ ***Rhipidoglossum arbonnieri*** – Photo by Eberhard Fischer (©) taken at Gatenga, Rwanda.

HABITAT – The species occurs in upland forest, near waterfalls, at 2000–2500 m altitude.

SEED DISPERSAL – Effective, tiny seeds are dispersed by wind (anemochory)

DISTRIBUTION – Endemic to the Albertine Rift, occurring in western Burundi and south-western Rwanda.

RED LIST PARAMETERS – EOO: 476 km²; AOO: 36 km²; Number of locations: not applicable.

JUSTIFICATION – The extent of occurrence (EOO) and the area of occupancy (AOO) both fall within the limits for the Endangered category under sub-criteria B1 and B2. The species is currently known from 5 herbarium specimens collected between 1990 and 1993, and should be considered as rare. Fortunately, both collecting sites occur inside protected areas (the Kibira National Park in Burundi and the Nyungwe National Park in Rwanda) which offer protection to the species. Because of that, and in the absence of threat, no locations can be assigned. Then, it is believed the species does not face habitat loss and is not in decline. Thus, the conditions required under sub-criterion B2 are not met, and the species cannot be

assessed into any threat category. Therefore, based on the above observations, it is listed as Least Concern (LC), but because its entire occurrence is within protected areas, the label Conservation Dependent has been added (CD).

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Rhipidoglossum ovale (Summerh.) Garay

RED LIST CATEGORY – **Vulnerable (VU)**.

IUCN CRITERIA – B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).

SYNONYMS – *Diaphananthe ovalis* Summerh.

DESCRIPTION - An epiphytic orchid with elongated pendent stem of 6–30 cm long; leaves linear, falcate, 2.5–8.5 × 0.3–0.5 cm, unequally bilobed at obtuse apex; inflorescences one to several, pendent, 5 9 cm long, with up to 20 flowers; flowers cream-coloured with purple tinge, 5 8 mm in diameter; dorsal sepal ovate, 2.5 × 2 mm, rounded at apex; lateral sepals oblong, 3 × 1.5 mm, obtuse at apex; petals oblong, 2.5 × 1.5 mm, obtuse at apex; lip concave, entire or obscurely 3-lobed, 2.3 3 × 2.4–2.7 mm, retuse at apex, without callus; spur incurved, up to 4.5 mm long.

► ***Rhipidoglossum ovale*** – Photos by Eberhard Fischer (E), specimen from Gishwati, Rwanda, growing at Bonn Botanic Gardens.

Habitat – It occurs in montane forests, at 2100–2400 m altitude.

Seed dispersal – Effective, tiny seeds are dispersed by wind (anemochory).

Distribution – Endemic to the Albertine Rift, occurring in western Burundi, south-western Rwanda, eastern Democratic Republic of the Congo and south-western Uganda.

Red List parameters – EOO: 17,226 km^2; AOO: 72 km^2; Number of locations: 6.

Justification – The extent of occurrence (EOO) falls within the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. The species is currently represented in herbaria by 10 specimens, collected between 1955 and 2005, and may be considered as fairly rare. Four collecting sites lie within protected areas (the Kibira National Park and the Nyungwe National Park in north-western Burundi, the Bwindi Impenetrable National Park in south-western Uganda, the Kahuzi-Biega National Park in eastern Democratic Republic of the Congo). Three other ones lie outside protected areas, where the rare remnant forest patches are cleared to make way for crop cultivation and for fire wood harvesting. As a consequence of this loss biota associated with the forest, we conclude the species faces a decline. The various threats lead to the estimation of 6 locations for this species and to infer a decline in number of mature individuals, EOO, AOO, quality of habitat and number of locations. Therefore, based on the above information, the species has been listed as Vulnerable (VU).

Bibliography – Fischer & Killmann (2008), Fischer & *al.* (2010), Geerinck (1984).

Poaceae

Chrysochloa hubbardiana R.Germ. & Risopoulos

Red List category – **Endangered (EN)**.

IUCN criteria – B2ab(iii).

Description – A robust, tufted perennial; culms 40–60 cm high, with creeping stolons; leaves up to 16 × 1 cm, rigid, glaucous; inflorescence with 6 to 9 digitate spikes of up to 11.5 cm long; rhachis triangular; spikelets densely imbricate; lemma carinate, 2.5–3 mm long, with an awn of 1–3 mm from below the apex.

Habitat – It occurs in open places on seasonally waterlogged shallow soils, at 1000 m altitude.

Seed dispersal – Effective, by wind (anemochory) or possibly by clinging to animal fur (epizoochory).

Distribution – Known from western Burundi, south-western and eastern Rwanda, western Tanzania and eastern Democratic Republic of the Congo.

Red List parameters – EOO: 97,288 km^2; AOO: 63 km^2; Number of locations: 4.

Chrysochloa hubbardiana Part of the spike (R), glumes (G1, G2), fertile flower (F), and rudimentary flower (Fo), fertile lemma (L), Fo and fertile palea (P). Drawing by Jacques-Félix, Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières (IRAT) (©), reproduced with permission from Jacques-Félix (1962); scan of the holotype specimen (Germain 6450) at BR.

JUSTIFICATION — The extent of occurrence (EOO) is far exceeding the 20,000 km² upper limit of the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits for the Endangered category under sub-criterion B2. It is known from 8 specimens collected between 1944 and 1969, and can be considered as relatively rare. Two collecting sites lie inside two protected areas (the Nyungwe National Park and the Akagera National Park in Rwanda) where it is safe. The other ones are from outside protected areas, where human pressure, following rapid population growth, has a strong negative impact upon the natural environment. This pressure includes agricultural and livestock expansion and human settlements extension. Moreover, the collecting sites from Burundi and Rwanda are isolated from the Tanzanian one so that the individuals may suffer the negative genetic effects of fragmentation. The pressure upon the environment leads us to estimate the number of locations to 4 and to infer an ongoing decline in extent and quality of habitat. Hence, based on the above information, the species is listed as Endangered (EN).

NOTE — Ndabameze (1989) considers *Chrysochloa hubbardiana* to be a synonym of *C. hindsii* C.E. Hubb., from which it differs in little but the exceptionally broad leaf-blades which impart quite a different appearance to the plant (Clayton & *al.*, 1974). This concept is, however,

not followed by several authoritative sources such as the African Plant Database (accessed November 2016) and GrassBase: The Online World Grass Flora (accessed November 2016). Hence, we treat *C. hubbardiana* as a species distinct from *C. hindsii*.

Bibliography – Clayton & *al.* (1974), Ndabaneze (1989), Ntore & *al.* (2017a57), Troupin (1988).

Xyridaceae

Xyris valida Malme

Red List category – **Near Threatened (NT)**.

Description – A perennial grass-like herb of up to 90 cm tall; leaves linear, 25–65 cm × 2–5 mm wide; inflorescence a dense globose spike; flowers yellow, with 3 sepals and 3 petals, 8–9 mm long.

Habitat – It occurs in swamps, peat bogs with *Sphagnum*, in humid meadows and on floating mats near lake shores, at 1125–3400 m altitude.

Seed dispersal – Limited, seeds are shaken out or fall from the capsule and are buoyant in water (hydrochory).

◄ *Xyris valida* – Photo by Eberhard Fischer (C) taken at Rwasenkoko Swamp, Rwanda.

Distribution – Occurring in central-western and north-western Burundi, south- and north-western Rwanda, as well as in eastern and south-eastern Democratic Republic of the Congo.

Red List parameters – EOO: 80,098 km^2; AOO: 216 km^2; Number of locations: 11.

Justification – The extent of occurrence (EOO) is far exceeding the 20,000 km^2 upper limit of the Vulnerable category under sub-criterion B1, whereas its area of occupancy (AOO) falls within the limits of the Endangered category under sub-criterion B2. It was collected 35 times between 1907 and 1976, and can be considered as relatively common. It has been collected in several parks and reserves (the Kibira National Park in Burundi, Kahuzi-Biega National Park and the Itombwe Natural Reserve in the Democratic Republic of the Congo and the Nyungwe National Park in Rwanda) where it seems safe. The species is also present in several sites outside protected areas, where human activities have a strong impact. The activities include drainage to convert marsh in agricultural area, and to allow peat extraction, and mining. However, those disturbances do not lead to a global noticeable decreasing in the near future. In addition, the total number of locations for the species is estimated at 11 (more than 10 locations, the upper limit of the Vulnerable category under the condition B2a). Thus, despite the fact that the species AOO meets the threat requirements under sub-criterion B2 and is declining, its population is not severely fragmented, occurs at 11 locations (close to the upper limit of Vulnerable thresholds), and there are no extreme fluctuations. In conclusion, it can't be assessed within a threat category, but could well become so soon when the human activities further increase. Based on the above information, the species has been listed as Near Threatened (NT).

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Scripta Botanica Belgica **58**

Red List of the endemic and range-restricted vascular plants of Burundi

The rapidly increasing population creates a high pressure on Burundi's very rich biodiversity. This book provides the formal threat assessment for the 135 vascular plants species with a limited distribution. Following the international standards imposed by IUCN, each species is assigned to a Red List category. More than 80 % of these species are threatened by human activities. This publication tries to underpin their conservation and support a durable future for Burundi's natural habitats.

Salvator Ntore (° Burundi, 1958) works as a botanist at Meise Botanic Garden, Belgium. He became a member of the Eastern African Plant Red List Authority in 2015 and recently also joined the Central African Red List Authority. He is a taxonomic specialist in Rubiaceae and a member of the editorial team of the Flore d'Afrique centrale.

Prof. Dr. Eberhard Fischer (° 1961) has been carrying out research on the flora and vegetation of tropical and temperate ecosystems for more than 30 years (tropical Africa, Madagascar, Georgia and Europe). His first trip to Burundi was in 1994. He is professor of botany at the University Koblenz-Landau.

Marc Sosef (° Delft, The Netherlands, 1960) works as Senior Researcher at Meise Botanic Garden. He coordinates the production of the Flore d'Afrique centrale and Flore du Gabon series. He used to be Professor in Biosystematics at Wageningen University, The Netherlands, and has a keen interest in grasses and Begoniaceae.

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